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ABSTRACT

This manual, intended for the librarian or information specialist beginning with online systems, introduces the National Agricultural Library's (NAL) Cataloging and Indexing System (CAIN) and presents the search techniques required for retrieving information on agriculture and its many related fields. The manual, which concentrates on the online mode of accessing the CAIN data base, discusses the basic strategies employed in constructing search strategies for online literature retrieval and the fundamentals of establishing computer communications; provides information about the CAIN unit record and cataloging and indexing practices followed by the NAL staff; and details information about access to the CAIN data base, including access with the DIALOG system of Lockheed Retrieval Service and through the ORBIT system of System Development Corporation. (Author/CWM)

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CAIN ONLINE USERS GUIDE

by

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P R E F A C E

The National Agricultural Library contracted to have its CAIN citation data base put online for literature retrieval in 1973, and since then has worked with several guides and manuals for course instruction and training. In the spring of 1975, the need for a substantial manual was expressed in order to obtain the most efficient utilization of the CAIN file online. This user's manual is intended for the librarian or information specialist who is beginning with online systems, or for those with little experience. It should be helpful, additionally, to clarify practices which are not recorded elsewhere for public use.

The chapters have been numbered to allow for drop-in changes or updatings. The National Agricultural Library plans to issue some of these as needed, such as policy and practice changes. We anticipate that similar notices of changes in programs, coverages, or practices by the two commercial firms - Lockheed Information Systems and Systems Development Corporation, who have put the CAIN CITATION Data Base online - may also be used in this manner.

The National Agricultural Library is very appreciative of the effort and time of Mr. Charles L. Gilreath, who invested far more work and industry than that recompensed by NAL. Comments or suggestions for changes should be forwarded to:

CAIN Online
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FOREWORD

The goal of this manual is to introduce the National Agricultural Library's Cataloging and Indexing System (CAIN) to those who wish to use it for retrieving published literature on agriculture and its many related fields. Hopefully, the novice will gain from the manual a basic understanding of CAIN and of the techniques required for retrieving information from the system, while the more advanced searcher will learn a few things from these pages that he did not know before.

Construction of a manual such as this would have been impossible without the generous assistance of many people. Maydelle Stewart of the NAL Indexing Section spent many long hours pulling together the information on indexing practices and policies represented in section II--information heretofore not conveniently available anywhere. My sincere thanks go to her and to all at NAL who answered all my questions when they arose.

Judy Wanger and Harry Boyle of the System Development Corporation staff and Thomas M. Crawford of Lockheed Information Retrieval Service always graciously answered my inquiries about their respective company's search systems. To these vendors goes another note of thanks for allowing me to paraphrase descriptions of some parts of their systems and to reproduce portions of their user manuals. Users should remember that this manual is only an adjunct to the complete user guides of each search service.

Charles L. Gilreath
College Station, Texas

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SECTION I. INTRODUCTION

A. The CAIN System

CAIN is the acronym for the automated Cataloging and Indexing system of the National Agricultural Library. The system, based on one in use at the Pesticides Information Center, started in January 1970. CAIN covers materials collected by NAL in the broad areas of agriculture and its related fields. Some of the specific areas covered are listed below:

Agriculture	Fertilizers
Agricultural economics	Foods
Agricultural engineering	Forestry
Agricultural products	Hydroponics
Animal industries	Nutrition
Botany	Pesticides
Chemistry	Plant sciences
Energy in Agriculture	Soils
Entomology	Rural sociology
Environmental pollution	Water management

Each month the staff at NAL produces a computer tape containing the records for items that have been cataloged or indexed during that period. From this tape several different products are printed, including cards for NAL's card catalogs, Bibliography of Agriculture, The National Agricultural Library Catalog, and the Catalog of the Food and Nutrition Information and Educational Materials Center.

Copies of the monthly CAIN tapes are also available to interested users outside the National Agricultural Library. These tapes can be used for direct bibliographic searching either in a batch mode or in an online, interactive mode. With such systems there are numerous information services that are possible, ranging from selective dissemination of information services (SDI) and retrospective literature searching on demand to retrieval of catalog copy and citation verification for interlibrary loan.

This manual will concentrate on the online mode of accessing the CAIN data base. The remaining parts of this section will discuss the basic strategies employed in constructing search strategies for online literature retrieval and the fundamentals of establishing computer communications.

Section II provides the user with information about the CAIN unit record plus discussions regarding cataloging and indexing practices followed by the NAL staff. Sections III and IV provide detailed information about access to the CAIN data base. Section III describes how to access CAIN with the DIALOG system of Lockheed Information Retrieval Service, and Section IV describes access to CAIN through the ORBIT system of System Development Corporation.

B. Fundamentals of Online Retrieval

This section outlines the fundamental principles of using online computer programs to retrieve citations from a bibliographic data base. A discussion of computer retrieval operation is followed by discussions of Boolean logic and search strategy formulation.

Computer Retrieval Operation

Online computer retrieval of bibliographic citations is based on the principles of coordinate indexing. A manual coordinate index is one in which each item to be indexed is given a unique identifying number which is posted to a series of index cards, one for each significant term associated with that item. Commonly, uniterms--single words drawn from titles, abstracts, etc.--are the terms used in such an index, although the indexer need not be restricted to such terms.

To illustrate, assume the item to be indexed is an article entitled "Insect Pests of Tomatoes." First, the item would be given an identification number--153, let us say. That number would be added to appropriate columns of index cards according to the last digit in the identification number as shown in figure 1. Posting in columns in this manner is simply to aid the eye in scanning numbers.

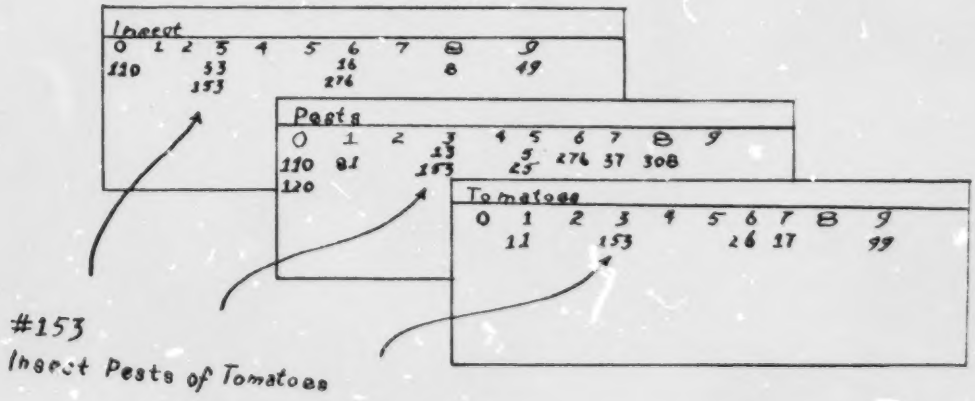


figure 1

To retrieve information from such an index, the user simply pulls appropriate index term cards and then looks for the occurrence of the same item numbers in different cards. For example, a user interested in finding information on drought-resistant strains of wheat might pull the three cards shown in figure 2.

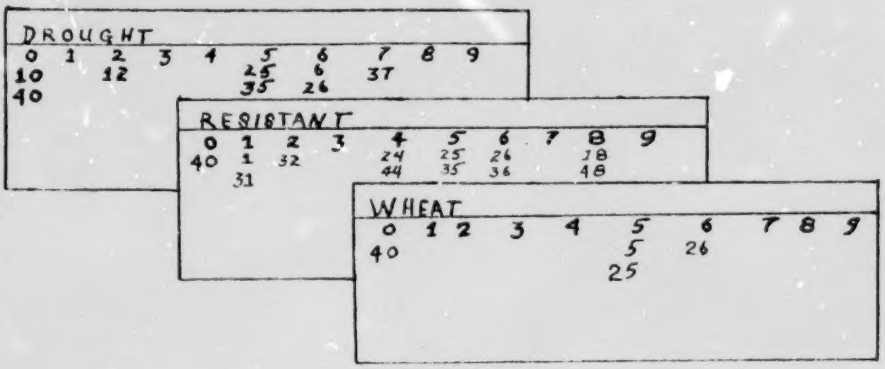


figure 2

From these cards the user would see that items 25, 26, and 40 contain all three of the desired terms and are therefore likely to be on the topic.

A manual system such as this one works reasonably well provided the data base is not too large or the number of terms to be searched is fairly small. But an index covering over 100,000 articles, or search strategies requiring that 15 or 20 terms be coordinated is too unwieldy for manual operation. The computer, however, is ideally suited to the task of comparing numbers required in such an indexing system.

The searching system for an online computer system is, in fact, merely a much more sophisticated version of the manual system described above. A typical online search file structure looks like the one illustrated in figure 3.

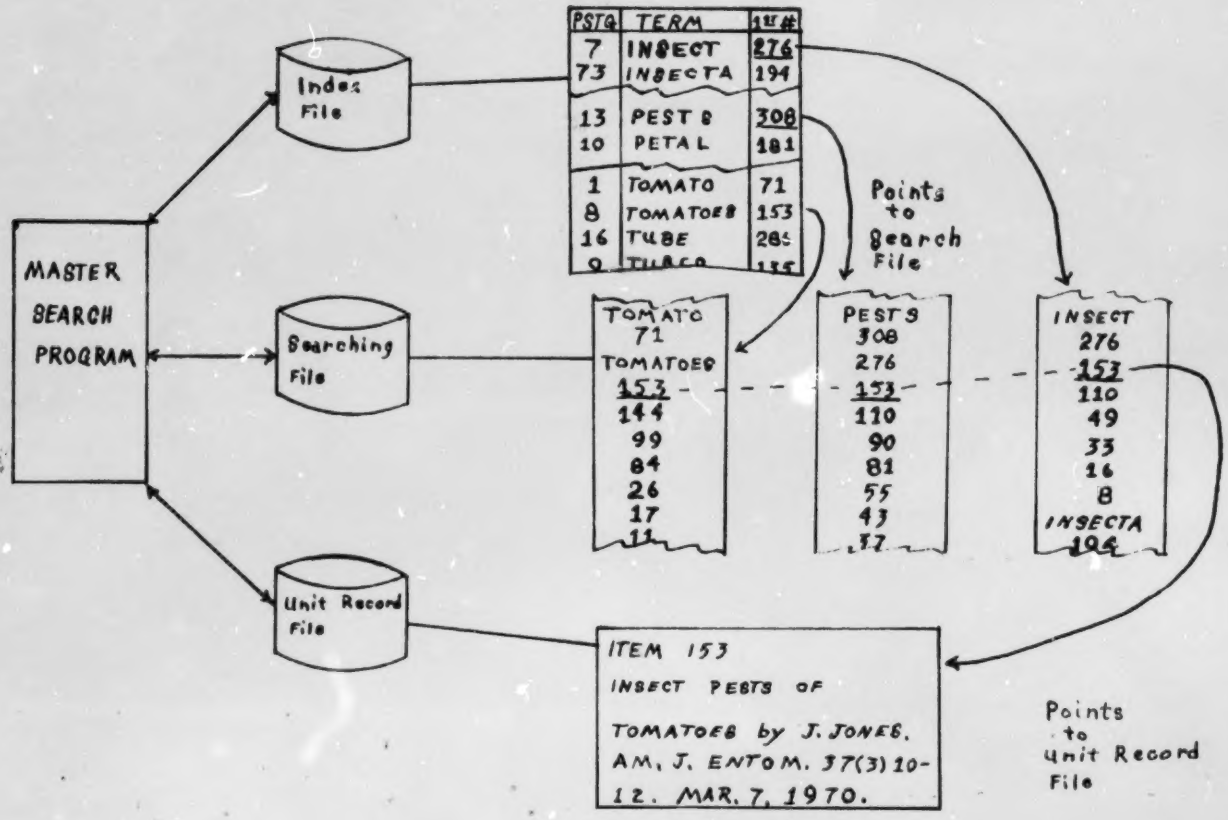


Figure 3

The Index File is an alphabetic list of searchable terms with the number of postings for each term and a pointer to the first item in the Searching File for that term. The Searching File is very similar to the card file of the manual system; it contains sequential lists of numbers for each term in the Index File. It is the numbers in this file that are compared when the computer looks for coordinations of terms. Finally, the Unit Record file contains the actual bibliographic citations in machine readable form. This file normally comes into use when the terminal operator requests to see the results of his searching.

Let us take again the example of a user looking for articles on drought resistant wheat to illustrate the operation of the online system.

The terminal operator instructs the program to find all coordinations of the three terms DROUGHT, RESISTANT, AND WHEAT. First, the computer goes to the Index File and finds the following information:

POSTINGS	TERM	1st #
8	DROUGHT	40
12	RESISTANT	48
4	WHEAT	40

It then goes to the Searching File, takes the appropriate item numbers from the file and compares them, as shown below:

DROUGHT	RESISTANT	WHEAT	COORDINATIONS
40	48	40	40
37	44	26	26
35	40	25	25
26	36	5	
25	35		
12	32		
10	26		
6	25		
	24		
	18		
	1		

Having found three items, the computer reports this fact to the operator. If the operator then wishes to view these three items, the computer goes to its Unit Record File, finds items 40, 26, and 25, and displays them at the terminal.

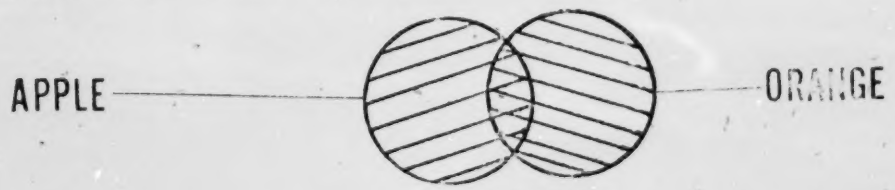
Boolean Logic

Having seen very generally what the computer does in response to commands from the user, we now turn our attention to the means by which the searcher instructs the computer to combine terms. This task is accomplished through the use of Boolean logic, named for its developer George Boole.

Individual search terms can be combined through use of the Boolean logical operators OR, AND, and NOT (sometimes called AND NOT). Use of these operators allows the searcher either to increase the recall of his final output by broadening search parameters or to increase the precision of his output by (1)cutting out unwanted elements or (2)narrowing search parameters. The function of each Boolean operator will be discussed in the paragraphs that follow.

Logical OR. The Boolean operator OR serves primarily an additive or broadening function. Its use allows the searcher to combine several terms into a single set or search statement.

The Venn diagram graphically illustrates the function of OR with the terms APPLE and ORANGE.



APPLE OR ORANGE

In normal English discourse a person who uses the conjunction "or" implies an exclusive arrangement; that is, when a person says, "Give me an apple or an orange," he expects one or the other but not both. Such is not the case with Boolean logic--or the computers which use it.

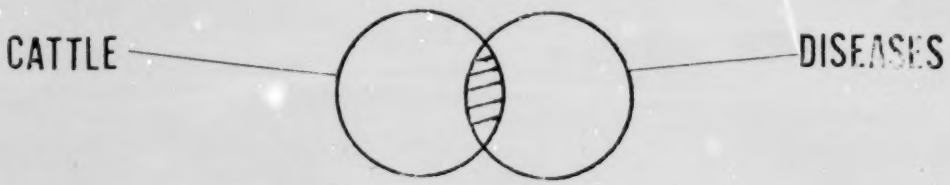
When he uses the logical OR, the searcher is, in effect, telling the computer to create a set consisting of all items in the data base containing either the term APPLE or the term ORANGE or both of them together.

Notice in the diagram that there is a small area where the circles overlap. This area represents those items which contain both of the search terms. Potentially the user could retrieve the same item twice,

using OR logic--once for each time one of his search terms appears. The computer, however, adjusts for this contingency and counts OR-ed terms in such a way that duplicate retrieval is eliminated. For example, assume the computer found 50 citations containing the term APPLE and 35 citations containing the term ORANGE. Also assume that there are 10 citations in the data base which contain both terms; when the individual sets were combined with OR, the result would then be a set containing 75 citations: 40 containing only APPLE, 25 containing only ORANGE, and 10 containing both terms.

Logical AND. The Boolean AND serves as a tool for narrowing the output of a search. The searcher uses this operator to look for co-occurrences of various search terms.

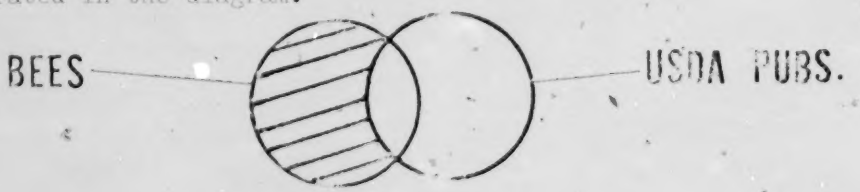
The Venn diagram for the search statement CATTLE AND DISEASES is illustrated below:



CATTLE AND DISEASES

The only items retrieved in such a search are the ones containing both of the desired terms. No word order is specified when the Boolean AND is used; so both an item entitled "Annual Review of Cattle Diseases" and one entitled "Diseases Common to Horses and Cattle" would be retrieved in this example.

Logical NOT (AND NOT). The NOT operator is used to exclude from a set some unwanted element. For instance, a user who desired information on bees but was not interested in USDA publications might wish to use NOT logic as illustrated in the diagram.



BEES NOT USDA PUBS.

The resulting set is a list of items containing the term BEES, excluding only those items published by the U. S. Department of Agriculture.

This method is a safe and proper use of the NOT operator. It may also be usefully employed to exclude other categories of information, such as the work of authors already familiar to the patron or articles in specific journal. In the course of broadening his search, the user may utilize this operator to eliminate from the broader output, sets which have already been retrieved, thereby allowing him to retrieve only the net increase of his broadened search.

Great caution must be exercised, however, in the use of NOT in order not to eliminate inadvertently desired citations. Problems of this type arise primarily in trying to use NOT to eliminate unwanted subject terms. For example, in a search on varieties of corn, the user may want to eliminate hybrid varieties, but there is no way to do this without also eliminating all items on ordinary varieties which may mention hybrid varieties in the same citation. Specifically, a title such as "Free Amino Acids in the Leaves of Inbred and Hybrid Varieties of Corn" would be eliminated by use of NOT in this way.

The following example will, perhaps, illustrate how the Boolean operators can work together to retrieve useful information. Let us assume that a searcher is looking for articles on the commodity futures market for wheat and corn. First, he selects separately the terms WHEAT and CORN and then combines them with the logical operator OR. Up to this point his computer printout might look like this:

SET#	CONTENT	# ITEMS
1	WHEAT	11812
2	CORN	7142
3	1 OR 2	18727

Note that the 18727 items in set 3 are 227 fewer than the arithmetic sum of the items in sets 1 and 2. This indicates that there are 227 items which contain both the terms WHEAT and CORN, and the computer has counted these items only once in a combined set.

The user then selects the search term FUTURES and combines it with the composite set number 3, thus:

4	FUTURES	143
5	3 AND 4	8

Finally, he chooses to exclude all monographic publications from his output. The printout would end up looking like this:

```
6  MONOGRAPHS   72931
7  5 NOT 6          7
```

To summarize, the user has had the computer look for all items in which the term FUTURES co-occurs with either CORN or WHEAT, and he has excluded any monographic publications from his output.

Search Strategy Formulation

Finally, we are ready to put things together into a general principle of search strategy formulation. The assumption underlying all computer retrieval of this type is that if a bibliographic citation contains a desired combination of specified keywords, then that citation may be relevant to the search topic. Of course, this assumption does not always hold true, as is illustrated by the retrieval of an article entitled, "Italian Economic Boat Leaking" during a search on the economics of the boating industry. It does, however, hold true often enough to make computer retrieval a valuable research tool.

While "false positives" such as "Italian Economic Boat Leaking" cannct be avoided totally, their number can be minimized through careful planning of the search strategy. If the essence of search strategy formulation can be summarized in one sentence, it is this: Efficient retrieval from a computerized bibliographic data base requires 1) a clear idea of the topic to be searched, clearly stated; 2) the development of an adequate list of keywords divided logically into concept groups; 3) an ability to adjust the initial strategy on the basis of information gained from preliminary review of search output.

Statement of the Search Topic

The end user of the computer produced bibliography is the best source of the initial statement of the search topic. It is his needs that are to be met by the computer search, and it is against his conception of the topic the results will be judged. If--as is commonly the case--the person doing the computer search is someone other than the end user, the statement of the topic may need to be negotiated. For instance an undergraduate student may say that he wants all citations on tissue culture, not realizing that the computer is likely to find over 2,000 hits--many of them in foreign languages.

A trained search analyst can, however, help the patron refine his initial request, revising it according to the patron's needs and the capabilities of the system.

A well negotiated statement of search topic should tell the searcher the following information:

1. The specific subject to be searched.
2. Priorities of various elements in the search topic, e.g. the user is specifically looking for desiccation as a technique in harvesting sunflower seeds, but anything on harvesting of sunflower seeds is also of interest.
3. Purpose for the search, i.e. is the search for an undergraduate's term paper or for a doctoral candidate's dissertation?
4. Any special requirements such as format of printed citations or date limitations, etc.

Keyword List and Concept Grouping

Once the searcher has a clear idea of the search topic, he must devise a list of appropriate keywords for the computer to search. Keywords can be single-word terms from titles and other subject related fields, authors' names, corporate sources and numerous other elements from the unit record categories. Depending on the data base, keywords may also be multiword terms drawn from controlled vocabulary lists.

A well expressed topic statement can serve as a guide to selecting appropriate keywords for the search strategy. The patron requesting the search is another valuable resource for additional terms, synonyms, and alternate forms of search words. Since the CAIN data base relies so heavily upon free text--uncontrolled vocabulary--searching, the analyst will be wise to consider including several alternate forms of key terms in order to allow for the many different ways in which ideas can be stated in the titles of works. For instance, the analyst who simply uses the keywords BEEF and CATTLE in his strategy, will fail to retrieve many relevant citations containing words such as COW, COWS, CALF, CALVES, BULL, and so forth. Asking the patron for the titles of some particularly relevant items with which he is familiar and/or looking through a few issues of printed indexes in the subject areas would be valuable sources of the terms likely to be used in the field. Controlled vocabulary lists, such

as the Agricultural/Biological Vocabulary or LC Subject Headings can also be most useful.

There is, of course, a point of diminishing returns in compiling such a list, especially in cases where the patron has imposed other constraints on the search, such as size of output or amount to be spent on the search. Complete coverage of a topic may, however, require a fairly long list of terms.

The other half of search strategy formulation is concept grouping. The computer is merely searching for strings of letters; it has no ability to judge the context of the terms. So the search analyst must try to compensate for the computer's weakness by increasing the number of parameters that must be fulfilled in order for a citation to be retrieved. He accomplishes this task by dividing the list of keywords into groups of synonyms and conceptually related terms and then instructing the computer to find the intersections of terms in the various concept groups.

Let us take a fairly simple example to illustrate concept grouping. A patron is looking for information regarding the effect seed size and weight have on the growth and yield of corn plants. A working list of keywords includes the following:

CORN	MASS
YIELD	LENGTH
GROWTH	WIDTH
SEED	PRODUCTION
SEEDS	MAYS
DIMENSION	MAIZE
DIMENSIONS	ZEA
SIZE	WEIGHT
YIELDS	GERMINATION

Individual combinations of all these various terms would consume inordinate amounts of both computer connect time and search preparation time. The same result, however, can be accomplished quickly and efficiently by grouping terms by concept, joining terms within this same concept group with the Boolean OR, and then looking for intersections of the various concept groups.

Our initial list, grouped for searching, would look like this:

I--CORN OR ZEA OR MAYS OR MAIZE

II--SEED OR SEEDS

III--SIZE OR WEIGHT OR DIMENSION OR DIMENSIONS OR LENGTH OR WIDTH OR MASS

IV--YIELD OR GROWTH OR PRODUCTION OR GERMINATION

The searcher would then instruct the computer to look for the intersections of the concept groups by combining them with the Boolean AND thus: I AND II AND III AND IV. To be retrieved, an item must then contain at least four keywords, one from each of the four major concept groups. Thus, this logic could retrieve titles such as "Seed Mass: Its Effects on Germination of Corn" and "Increased Seed Dimensions Produce Greater Yield (CORN)."

Adjusting Initial Strategy

Regardless of how thoroughly the analyst has prepared the initial search strategy, there will be times when the system will turn up valuable search terms that have been overlooked. Conversely, the search may also prove that terms originally thought to be good, are retrieving far too many bad hits and therefore need to be excluded from the strategy. The searcher must be aware of these possibilties so that he can add them to appropriate concept groups in order to increase the quality of the final bibliography.

Users of batch mode searching systems should review their initial results critically and make necessary adjustments so that succeeding iterations of the search will be better. Online system users have a decided advantage over batch system users in that they can adjust their strategies immediately and assess the quality of the additional items retrieved in a matter of seconds.

C. Online Communication

Access to CAIN-Online can be gained through regular teletype terminals, high-speed dedicated-line computer terminals, or teletype-compatible acoustically coupled terminals. While both of the major online vendors can support access to their data bases via teletype, users should be aware that using teletype terminals will very likely result in higher search costs because they are slower in outputting results (100 wpm) and because the TWX line charges are generally higher than the communications charges for using the Tymshare network.

Dedicated line terminals offer the greatest speed (around 480 characters per second). But they also generally involve the greatest expense. Their use is, therefore, probably limited to large volume operations.

The most common means of accessing online data bases is through acoustically coupled, teletype-compatible terminals. Such devices are supported by both vendors through regular telephone connections up to a speed of 30 characters per second (300-350 wpm).

There are two main types of teletype compatible terminals: hard copy printers and cathode ray tube (CRT) terminals. Hard copy printers are simply typewriter-like terminals which print the two halves of the online dialogue on a piece of paper. Many models are portable, an advantage for users who expect to be carrying terminals around for demonstrations. Cathode ray tube terminals differ from hard copy terminals in that they display input and output on a television-like screen. Such terminals are not much more expensive than the terminals using paper and certainly have some advantages if the user anticipates having to demonstrate the retrieval system to groups. Two decided disadvantages, however, are the lack of portability and the lack of a permanent record of the search history. Hard copy printing devices can be added to CRT terminals for printing required information, but these are another substantial addition to the cost of the terminal.

The keyboards of these terminals resemble a typewriter with several additional keys. They communicate with the computer through an acoustical connecting device built into the terminal or wired to it. A terminal operator establishes communications with the computer by dialing the

telephone number for the search service or for the intermediary communications network, Tymshare. As soon as he hears a shrill, steady tone, he places the telephone receiver into the acoustical coupling device and starts entering the necessary information to be logged in. As the keys on the keyboard are pressed, tones are emitted by the terminal. They are picked up by the telephone and transmitted to the host computer.

Logging In

Logging in refers to the steps by which the user establishes data communications, connects his terminal to a vendor's computer, and gains access to the online program. The mechanics of this procedure depend upon two factors:

1) the type of terminal
2) the method of communication (Direct Dial or Tymshare)

The procedures outlined below will assume a teletype compatible terminal. A user with another type of terminal should refer to the operating manual for that terminal before attempting to log in.

Direct Dial

Both System Development Corporation and Lockheed provide their subscribers with service through direct dial long distance telephone lines, provided that the subscribers have 30 characters-per-second teletype-compatible terminals.

Steps for logging in on both systems are outlined below.

DIALOG	ORBIT
1. Presettings Power Switch to ON Duplex switch to HALF Speed switch to 30 CPS *Space switch to SINGLE *Mode switch to LINE or ONLINE *QSL switch to UPPER *Parity switch to ODD	1. Presettings Power switch to ON Duplex switch to HALF Speed switch to 30 CPS *Space switch to SINGLE *Mode switch to LINE or ONLINE *QSL switch to UPPER *Parity switch to EVEN
2. Dial telephone number 415-493-7580** When steady high-pitched tone is heard, plug telephone receiver into sockets on the terminal. (Cord side of the telephone receiver must match the terminal socket marked CORD.) The ONLINE indicator light should now illuminate, signaling that the connection has been made.	2. Dial telephone number 213-828-9141** When steady high-pitched tone is heard, plug telephone receiver into sockets on the terminal. (Cord side of the telephone receiver should match the terminal socket marked CORD.) The ONLINE indicator light should now illuminate, signaling that the connection has been made.
3. Computer responds: TYPE IN DIALOG PASSWORD Enter your unique password followed by striking the carriage return key (RETURN, TRANSMIT, or INT, depending upon terminal make).	3. Once the ONLINE indicator comes on the system is ready for login. Enter: /LOGIN XXXXXXX## (your SDC password) followed by striking the carriage return key (RETURN, TRANSMIT, or INT, depending upon terminal make).

* Position and/or availability of these switches depends on the terminal being used.

** Users with 10 or 15 CPS terminals will be given other telephone numbers for direct dial up service.

DIALOG	ORBIT
4. Computer responds: PASSWORD ACCEPTED (time) plus several lines of the Lockheed Information Systems heading.	4. Computer responds: YOU ARE ONLINE plus several lines of greeting from the ORBIT III program
5. Computer gives the cue "?" indicating that the system is ready to accept the user's first command.	5. Computer gives the cue USER: indicating that the system is ready to accept the user's first search statement of command.

Tymshare

Logging into the Lockheed or the SDC systems through the Tymshare communications network is slightly more involved than logging into the systems directly. The user must go through three additional steps in order to identify his terminal and to get routed through the Tymshare system. After the Tymshare communications switching has been accomplished, logging in is identical to that for direct dial users.

DIALOG	ORBIT
1. Presettings Power switch to ON Duplex switch to FULL Speed switch to ___CPS (10, 15, or 30 CPS) *Space switch to SINGLE *Mode switch to LINE (ONLINE) *QSL switch to UPPER *Parity switch to EVEN	1. Presettings Power switch to ON Duplex switch to FULL Speed switch to ___CPS (10, 15, or 30 CPS) *Space switch to SINGLE *Mode switch to LINE (ONLINE) *QSL switch to UPPER *Parity switch to EVEN
2. Dial Tymshare telephone number: (see attachment). When steady, high-pitched tone is heard, plug telephone receiver into sockets on terminal. (Cord side of the telephone receiver must	2. Dial Tymshare telephone number: (see attachment). When steady, high-pitched tone is heard, plug telephone receiver into sockets on the terminal. (Cord side of the telephone receiver must match

DIALOG

match the terminal socket marked CORD.) The ONLINE indicator light should now illuminate, signaling that the connection has been made.

3. Computer response will be an unintelligible string of characters (if terminal is operating at 30 CPS) or the message: PLEASE TYPE THE LETTER D (if terminal is operating at 10 CPS). Enter the appropriate terminal identification letter (see attachment).

4. Tymshare log in
Computer responds:
PLEASE LOG IN:
Enter a carriage return only.
Computer responds:
USER NAME:
Enter: LMS followed by a carriage return.
Computer responds:
PASSWORD:
Enter (Tymshare Password) followed by a carriage return. (The password will not appear on the printout.) There will be a slight delay while the Tymshare computer makes the connections with the Lockheed computer. Once

ORBIT

the terminal socket marked CORD.) The ONLINE indicator light should now illuminate, signaling that the connection has been made.

3. Computer response will be an unintelligible string of characters (if terminal is operating at 30 CPS) or the message: PLEASE TYPE THE LETTER D (if terminal is operating at 10 CPS). Enter the appropriate terminal identification letter (see attachment).

4. Tymshare log in
Computer responds:
PLEASE LOG IN:
Enter a carriage return only.
Computer responds:
USER NAME:
Enter: SDC followed by a carriage return.
Computer responds:
PASSWORD:
Enter (Tymshare Password) followed by a carriage return. (The password will not appear on the printout.) There will be a slight delay while the Tymshare computer makes the connections with the SDC computer. Once connection is

	DIALOG	ORBIT
	connection is effected, the Tymshare computer responds: HOST IS ONLINE, and the Lockheed computer then responds: PLEASE ENTER YOUR DIALOG PASSWORD. Enter your unique password followed by striking the carriage return key. The Lockheed computer responds LOGON AT (Time) plus the Lockheed introductory heading.	effected, the SDC computer will print a semicolon directly over the letter P in PASSWORD to indicate that it is ready to receive a login statement. Enter /LOGIN (Your SDC Password) followed by a carriage return. The SDC computer responds: YOUR ARE ONLINE plus a few more lines of greeting from the ORBIT III program.
5.	Computer give the cue "?" indicating that the system is ready to accept the user's first command.	5. Computer gives the cue USER: to indicate that the system is ready to receive your first statement or command.

Errors and/or Incomplete Login

If you make an error during the logging in procedure, if one of your transmissions is garbled by line noise, or if Tymshare cannot complete your connection, you will receive a message from either the Tymshare computer or one of the search service computers.

Messages from Tymshare are:

ERROR, TYPE USER NAME:	Enter either IMS or SDC and a carriage return.
ERROR, TYPE PASSWORD:	Enter the appropriate Tymshare password and a carriage return.
ALL CIRCUITS BUSY	This means that the Tymshare system itself is working at full capacity and is temporarily unable to accept any new users. Try logging in again after waiting a few seconds.

OUT OR PORTS	This means that the host system (SDC or Lockheed) is working at full capacity and is temporarily unable to accept additional users. Try logging in again after waiting a few seconds.
HOST DOWN	This means that the host system (SDC or Lockheed) is temporarily not operational. Wait at least 2 minutes before trying to log in again.
HOST NOT ON NET	This means either that Tymshare has not brought that host system up yet or that connection between the host and Tymshare has been broken. It may take several minutes to correct this situation.

Should you make an error after being connected to one of the host systems, you will receive one of the following messages:

DIALOG	ORBIT
BAD PASSWORD AT (Time) PLEASE ENTER YOUR DIALOG PASSWORD You should re-enter your Lockheed password and a carriage return.	LOGIN ERROR, RETRY You should re-enter /LOGIN (SDC Password) plus a carriage return. A mistake at this point will prompt the following message from the computer: PLEASE RE-ENTER: /LOGIN USER ID You should type /LOGIN (SDC Password) plus a carriage return.

Logging Off

After you have completed your searching, you should log off the system before hanging up your telephone. This procedure performs three important functions: 1) stops the search timer, 2) stores any information relating to off line printing requests, and 3) disconnects your terminal from the search service computer.

A. DIALOG

To log off the DIALOG system, simply type LOGOFF followed by a carriage return. The computer will then automatically generate an END command and respond with the following:

```
EVENT:  TIME, SEARCH TIME, DATE, USER#, DESCR, DOCS, FILE
END:  11:32:06, 000.84, 07/14/75, 1299, 0007, 0004, 10
DIALOG SESSION TERMINATED AT 11:32:11
```

At this point the user can hang up his telephone, or if he is using the Tymshare network, he should receive the following message after he logs off:

```
DROPPED BY HOST SYSTEM
PLEASE LOG IN:
```

At this point you may log back into DIALOG or any other system served by Tymshare.

B. ORBIT

Logging off the ORBIT system is a two step process. First enter the command: "STOP" (the double quotation marks must be present). To this the system responds: DONE?(Y/N). Type in Y or YES (without quotation marks since this is a reply to a system question), and the computer will respond: PLEASE HANG UP YOUR TELEPHONE NOW. GOOD-BYE!

After logging off the ORBIT system, the Tymshare user can only log back into the ORBIT system. If he wishes to switch to another system such as DIALOG or the online system of the National Library of Medicine, the user must hang up and dial into Tymshare again.

SECTION II: PRODUCING CAIN TAPES

A. The CAIN Master Unit Record

The CAIN tapes are made up of thousands of unit records, individual bibliographic entries in a standardized format consisting of a 173-character, 49-field base record describing particular aspects of the citation, followed by up to 57 segments containing the bibliographic elements such as author, title, subject tracings, and so forth. Those who use the CAIN tapes either in batch mode or through their own online system can pull from this standardized record those elements of most interest to them.

Commercial online retrieval services take the CAIN tape and select certain items from these unit records for searching in their own systems. Certainly, not all vendors will choose the same elements for online searching; therefore, close study should be made of the structure of the online unit record described by each vendor. For instance, where one company may have chosen to make a particular field of the master unit record searchable, another may only print that field as part of a full citation without allowing it to be searched at all. Or where one company searches two master unit record categories as separate items, another may combine the categories for searching. See sections III-D and IV-D for descriptions of the DIALOG and the ORBIT versions of the unit record.

The next few pages describe the CAIN Master Unit Record and the kinds of information that can potentially be retrieved from it. Those planning to access the CAIN tapes with their own institution's equipment may find this description particularly useful.

NATIONAL AGRICULTURAL LIBRARY
COMPUTER APPLICATIONS
CAIN MASTER FILE
CAIN PERMANENT MASTER RECORD

Magnetic tape is 9 track, 800 bpi, EBCDIC code with standard IBM-360 header and trailer labels. Records are variable length 173 to 3878 characters, blocked 2.

This record contains a base or fixed length portion of 173 positions which contain various fixed length fields as described below.

The base record is followed by a variable number (ranging 0 to 57) of fixed length segments (each segment is 65 positions long) which contain the bibliographic data.

Position	Field Name	Description
1-2	File Code	Always "02".
3-4	Year	Year record was created.
5-11	ID Number	Unique record identification number. For monograph records the first position contains a "9" and the remaining 6 positions are the NAL accession number. For serial and serial article records an arbitrary number is assigned.
12-17	Primary Category Code	6 digit primary subject category code.
18-19	Reserved	Used for CAIN internal processing.
20	English Indicator	0 = Text in English 1 = Text is not in English
21	Translation	0 = No translation 1 = Translation is available.
22-24	Language Code	3 character abbreviation indicating text language if not in English.
25	Approval Code	Always "1", indicating the record has been reviewed and approved as an addition to the CAIN permanent file.

Position	Field Name	Description
26-29	Proprietory Restrictor	A 4 character code, indicating restriction of proprietory information.
30-37	Search Date	Publication date of the document that generated this record, formatted YYYMMDD. This date is used by NAL software for information retrieval purposes.
38-43	Last Revision Date	Date this record was placed on the file or date of last revision to this record. (Format = YYMMDD).
44-46	Segment Count	Determines the length of the variable portion of this record. It contains a number range 000 to 057 which is the actual number of fixed length data segments in the record. Since each data segment is 65 characters in length, this count multiplied by 65 is equal to the number of characters in the variable length portion of the record.
47-50	Record Length	Total number of characters in this record not including those characters added and used by IBM-360 software for variable length record handling. This number must be in range 173 through 3873.
51-59	Citation Number	Contains zeros in the CAIN permanent data file record. For intermediate CAIN publication file records it contains the citation number of a specific NAL publication.
60-61	Reserved	Work area. Internal CAIN processing.
62-67	Secondary Category Code	6 digit secondary subject category code or zeros if a secondary code is not available
68	Reserved	New record indicator. Internal CAIN processing.

NOTE: The following 17 fields are 5 characters in length and make up a directory for the purpose of locating the fixed length segments (65 characters each) that comprise a variable length data element (title, author, etc.). Each field is related to a specific data element and contains a number which points to the starting segment and gives actual number of segments contained in the data element. The format is XXXYY where XXX = the starting segment of data for the specific data element and YY = the number of segments used to contain the data element. The starting segment number is relative to the first segment in the record.

Position	Field Name	Contents of Segment (To which this Directory Entry Points)
69-73	Directory Entry 1	New Book Shelf descriptive information.
74-78	Directory Entry 2	Document titles, Edition Statement and Holdings Statement.
79-83	Directory Entry 3	Personal Author names and descriptive data.
84-88	Directory Entry 4	Corporate Authors.
89-93	Directory Entry 5	Author Biographic data.
94-98	Directory Entry 6	Abbreviated Journal Title for serial article records. Imprint data for monograph records.
99-103	Directory Entry 7	Pagination.
104-108	Directory Entry 8	Document Date, formatted for printing.
109-113	Directory Entry 9	NAL Call number and various NAL citation number/s depending on which NAL publication/s contained this record. Segment is formatted as follows: Position 1-24 NAL Call number Position 25-32 Book Catalog Citation Position 33-40 B of A Citation Number Position 41-48 REF Citation Number Position 49-56 AGEC Citation Number NOTE: The citation numbers will only be present on the CAIN permanent data file records.
114-118	Directory Entry 10	Subject terms
119-123	Directory Entry 11	Notes.
124-128	Directory Entry 12	Information relating to patents, grants, analyses, contracts or reports.
129-133	Directory Entry 13	Series Statement.

134-138	Directory Entry 14	Abstract/Extract.
139-143	Directory Entry 15	Tracings.
144-148	Directory Entry 16	Always zeros. Reserved for future use.
149-153	Directory Entry 17	Non-vocabulary cross references.
154-155	Main Entry Code	Contains a numeric identifier of the NAL main entry for this record if other than personal author. 00== Following sequence (First Available) 25 = Personal author 20 = Title 30 = Corporate Author
156	Title Trace Code	Indicates whether or not the title is a tracing. 0 = Title is a tracing. 1 = Title is not a tracing.
157	Document Type Code	Type of document which generated this record. 0 = Journal article. 1 = Monograph. 2 = Serial.
158-160	Filing Location	3 character alphabetic abbreviation indicating the NAL filing location of the document.
161-165	User Codes	Indicates type of usage made of this record by NAL which is as follows:
161	Cataloging Users Code	0 = Record which does not require a card. 1 = Catalog card required without subject terms. 2 = Catalog card required but must have subject terms. 9 = Record not to be printed in the NAL Catalog or any NAL publication.
162	NBS Users Code	0 = Record not to be published in the NAL New Book Shelf List. 1, 2, or 3 = Indicates section of NAL New Book Shelf List in which this record will appear.

163	Indexing Users Code	1 = Indexing record.
164	Reference Users Code	Same as position 161 but pertains to NAL's Reference collection.
165	Microfilm Users Code	Same as position 163 but indicates that the document is on microfilm.
166-170	Filler	Always zeros.
171	Review code	A "1" if the document contains a review of literature on a specific subject, otherwise zero.
172	Bibliographic Code	A "1" if the document contains a bibliography, otherwise zero.
173	Source Code	1 character code indicating the source of the document which generated this record. 0 = Source is not one of the following 1 = USDA publication 2 = State Agri. Exp. Station Publication 3 = State Agri. Extension Service Publication 4 = FAO of the United Nations 5 = Translations
174-3878	Data Segments	Variable number of fixed length 65 character data segments. Number of segments can range 0 through 57. An actual count is carried in each record in positions 44-46.

Data Segments are formatted as follows:

Position	Field Name	Description
1-60	Data Segment	Data elements are described earlier under "Contents of Segments".
61-62	Sequence Number	The segments of each data element are adjacent to one another in the record and arranged in sequence as to "Sequence Number". For certain elements the "Sequence Number" is used to further identify subsets of the data within an element. Those elements containing subset identification are as follows:

Element	Subset within Element	Sequence Number Range
Title	Short Title	01-15
	Alternate Title	21-35
	Translated Title	41-55
	Edition Statement	61-64
	Serial Holdings Statement	65-68
Corporate Author	First Corporate Author	01-09
	Second Corporate Author	11-19
	Third Corporate Author	21-29
	Fourth Corporate Author	31-39
	Fifth Corporate Author	41-49
	Sixth Corporate Author	51-59
	Seventh Corporate Author	61-69
	Eighth Corporate Author	71-79
	Ninth Corporate Author	81-89
	Tenth Corporate Author	91-99
Tracings	First Tracing	01-09
	Second Tracing	11-19
	Third Tracing	21-29
Non-Vocabulary Cross Ref.	First Cross Reference	01-09 and 11-19
	Second Cross Reference	21-29 and 31-39

Except for Corporate Author, Journal Title Abbreviation, Imprint and Subject Term data elements, the "Sequence Number" is unique within an element. Each hierarchical level of a corporate author carries a unique sequence number, and levels of up to nine segments in length are permitted. To accommodate this and to identify a hierarchical level as being longer than one segment, the "Sequence Numbers" is duplicated in additional related segments. Subject terms are likewise treated, except that only two segments are permitted for a single term. Journal Title Abbreviation and Imprint data, although unlike corporate authors and subject terms in that only a single occurrence of the element is permitted, will carry identical "Sequence Numbers" when the element exceeds a single segment. Only two segments are permitted for these elements.

63	Type Code	For subject term segments this position contains "P", "S", "T" or "G" which defines the term type. For patent, grant, analyses, contracts or report segments it contains "P", "S", "A", "C" or "R" designating type of data in that element. For non-vocabulary cross reference segments this position contains a "P", "C" or "M" which indicates that the data is a personal author, corporate author or microfilm number/ call number cross reference.
64-65	Character Count	Contains the actual number of characters in the segment. The count ends with the last non-space.

B. CAIN Indexing

It is necessary to realize that the Indexing Section is only one part of a large library and is affected by decisions on matters unrelated to its product--the NAL indexing portion of the CAIN tape. The tape also contains records from the Cataloging Section and the Food and Nutrition Information Center (FNIC). Material to be indexed must be selected, acquired, cataloged, recorded and routed to the Indexing Section by other sections of the Library. Indexers scan the material and select items according to criteria which will be explained in the sections that follow. Approximately 6,000 serials and many monographs are regularly scanned for items to be indexed.

The Library collects exhaustively all significant publications of agricultural interest and less exhaustively publications in chemical, biological, environmental areas. The coverage of agriculture, botany, and entomology is as complete as possible, given certain constraints of personnel and budget and the tendency of State and Federal Governments to reorganize agencies and cause communication gaps. A case illustrative of this latter problem is NAL's less than complete coverage of materials dealing with wildlife and wildlife management, an area covered in depth by many agricultural libraries. NAL's responsibility for collecting in this area shifted several years ago when the Department of Interior was given responsibility for much of this area. Since that time NAL's coverage in this area has been limited generally to the effects wildlife has on agricultural production--e.g. wild animals as crop pests or as predators of domesticated animals.

Although NAL attempts to be as complete as possible in its coverage of items within its defined areas of responsibility, gaps in coverage can occur for several reasons--some through unintentional oversight and some as a result of established policies. Illustrative of the former cause is the problem of selecting serials for indexing. A serial which was not selected for routing to the Indexing Section may have occasional articles within the scope of the Bibliography of Agriculture, or it may have changed its coverage since the routing decision was made. Such cases should be called to the Indexing Section's attention. The other cause--gaps caused by NAL policy--is illustrated by the cases of dissertations and of

microforms. The call number is required for each CAIN record, so unclassified items such as dissertations will not appear in the CAIN data base. Microforms generally are not given cataloged analytics, and as a result many government documents, FAO publications, and research reports purchased by the library only in microform will not be picked up in CAIN. The Indexing Section's policy of not taking material over a year old may also cause gaps in the indexing record. This is especially true where serial subscriptions lapse or where claiming of missing issues is delayed.

While some types of materials will normally not show up in CAIN, other items will regularly appear twice on the tapes. Any material that needs to be filed in NAL's public catalog and also published in the Bibliography of Agriculture, such as important USDA, Experiment Station, or Extension Service series, and other separately paged series worthy of special note, will be on the CAIN tape twice, once as an indexing record and once as a series analytic from cataloging. There will also be some duplicate items from the FNIC data base.

The sections which follow will attempt, first, to explain the subject and non-subject criteria used to select items to be indexed for the Bibliography of Agriculture and, second, to outline the indexing and subject enrichment policies followed by NAL indexers. Thorough understanding of these policies should enable searchers to understand better the structure of the CAIN files.

Non-Subject Selection Criteria for Indexing

I. Omit the following:

A. Time

1. Items whose date of publication is over 1 year old except USDA publications and important congresses and conferences. (Does not apply to FNIC items).
2. Statistical publications covering less than 1 year, unless the statistics are cumulated on a shorter basis only.

B. Length

Non-scientific articles less than one-half page, but take any article on insects or plant taxonomy, regardless of length.

C. Form.

1. Catalogs of shows or indexes of plants.
2. Courses of study.
3. Forms.
4. Newspapers
5. Prize papers below college level.
6. Student publications.
7. Restricted use publications.
8. Articles signed with pseudonyms.
9. Articles with date line, or reports from cities and similar items.
10. Editorials, unless by USDA personnel, or of clear agricultural importance.
11. Interviews, except in unusual cases.
12. "Monthly hints" type of materials.
13. Presidential addresses without titles unless by USDA personnel or of clear agricultural importance.
14. Regularly featured columns.
15. Separate translations of journal articles. (These are on the CAIN tape as cataloging items.)
16. Unsigned articles except when of clear agricultural importance.
17. Abstracts except for those in conference proceedings which appear to be of the same quality as the complete papers.
18. Reprints, unless they are items in a USDA, State Experiment Station or State Extension Service series.
19. Letters to the editor, except those in scientific journals and at least one page in length.
20. Microforms.

D. Treatment

1. Personal experience articles, unless original device or method used.
2. Popular articles on amateur gardening, home processing of foods, bee keeping, poultry or rabbit raising and similar material.
3. Reports about meetings, symposia, shows, or conferences.
4. "Success stories."

II. Accept the following:

A. Articles in USDA publications and articles by USDA personnel.

B. Awards given to scientists for agricultural research, if at least one-half page long.

C. Biographies or obituaries of scientists connected with agriculture, if at least one-half page long.

Subject Selection Criteria for Indexing

In general, items are selected for indexing on the basis of their relevance to the fields of food and agriculture. The basic criteria for selection are outlined in the scope notes for the subject categories.

Bacteria and viruses

Articles on bacteria and viruses are selected on the basis of their relation to agricultural subjects. Items are selected in the following areas:

1. Pathogens of plants, insects, or livestock
2. Use of bacteria and viruses in biological control of insects or weeds
3. Symbiotic bacteria of plants
4. Soil microbiology
5. Rumen bacteria
6. Bacterial and viral contaminants of food or feed
7. Bacteria used in processing foods or other agricultural products
8. Bacteria as food or feed (single-cell protein)
9. Bacteria as affected by pesticides or pollution from agricultural sources

Plants

All items are selected on plants--from Cyanophyceae (blue-green algae) up through the higher plants--on the theory that they are all of potential agricultural interest. One exception to this rule is the exclusion of fungi pathogenic to humans.

Invertebrates

All entomological literature is taken, again on the theory that it is all of potential interest to agricultural researchers. Selection in the classes Insecta, Myriapoda, and Arachnida is exhaustive. Only the terrestrial members of the class Isopoda (sowbugs, pillbugs) are selected for indexing.

Articles on crustaceans are taken only if the organisms are treated as food or have other agricultural implications. Annelida are taken as they affect plants, livestock, or soil only. Mollusca are taken only if the organism is treated as a food or has other agricultural implications (e.g. snails and slugs).

Insect parasites or pests of man are taken, but all other animal parasites or pathogens are taken only when they affect agricultural subjects.

Vertebrates

All items are taken on livestock and other animals raised on farms (e.g. fur bearing animals raised in pens). Articles on laboratory animals of interest to veterinarians, agricultural research institute or specialists in human nutrition are taken. Articles relating to human pathology and physiology are excluded unless they relate to diseases of livestock or to diseases caused by contaminated food, malnutrition, nutritional deficiencies, nonfood agricultural products through the primary processing stages, pesticides or pollution from agricultural sources. Articles on vertebrate agricultural pests are assigned to subject categories according to the aspect covered, e.g. plant pests, 4520; stored grain pests, 2035; etc.

Fish and wildlife are taken in relation to their use as food, feed, or fertilizer, to their being raised on a farm (e.g. aquaculture), or to their being affected by pesticides or pollution from agricultural sources. Wildlife as it affects farm or forest operations is taken.

Weather

Articles on climate are taken if they treat the climate as it affects agriculture: e.g. agriculture in general in subject category 0505, physiology of field crops in 4035, culture of field crops in 4050, animal production in 2505, construction of animal housing in 5505, etc.

Agricultural Economics and Sociology

All articles on agricultural economics, rural development, rural sociology, and rural health are taken, but many appear in journals which are not subscribed to by the Library because their content of articles on agriculture is so low. The economics of synthetic products is taken when the products are in competition with agricultural products.

Agricultural Products

Items are selected on agricultural products, taken only through the primary processing stages. Articles on manufacturing processes after primary off-farm processing are taken only when they are affected by properties of the raw materials or as they relate to consumer protection (standardization, inspection, quality control, contamination, etc.).

Treatment of specific products is discussed below.

1. Textiles from natural fibers are taken through the spinning process; this includes rot-proofing, water-proofing, fireproofing, etc. Further processing stages are taken only when emphasis is on the properties of the fiber.
2. Pulp and paper are taken through the pulping process but not the actual paper sheet production process, except where this process is affected by the properties of the wood or other natural fibers.
3. Tobacco is taken as a raw product or derivative but not cigar or cigarette manufacture, unless the emphasis is on the raw material.
4. Natural rubber is taken through initial processing of the latex. Articles on further processing or on synthetic rubber are taken only as they relate to the properties of the natural rubber.
5. Extracts from insects and plants are taken, but not from domestic animals (unless related to agricultural subjects in other categories).
6. Furniture and building materials for other than farm structures are taken only in relation to their agricultural or forest product content.
7. Food products are taken through all stages of processing, but not in relation to the machinery, management and labor, or economics of their manufacture unless that aspect is concerned with the properties of the raw materials.

Title Enrichment

The Indexing Section (as opposed to the Cataloging Section and FNIC) does no formal indexing with a controlled vocabulary. Over onethird of the titles of indexed items are, however, enriched according to the following criteria:

1. Ambiguous titles should be clarified.
2. Each title should contain the scientific name for insects, agriculturally important nematodes and pathogenic organisms and the following plants: grass, shade trees, forest trees, nut trees, ornamental plants, drug plants (except castorbeans) spice plants, essential oil plants, rubber plants, weeds, poisonous plants,

miscellaneous economic plants, and plants of unknown use.

3. Each title should contain the common name of domestic animals, diseases (when English language form is available), and the following plants: cereals, fiber, forage (except grasses), edible oil crops, sugar, tobacco, fruits, vegetables, coffee, tea, and cocoa.

4. Chemical terms in titles should be enriched by an approved common name, if readily available or if provided in the article.

5. A title should be enriched if an important subject term is abbreviated (except for DDT, DNA, RNA, and tRNA). If the common name of an abbreviated chemical name cannot be found, the full chemical name is used.

6. The title of a biographical article lacking the name of the profession to which the person belongs should be enriched with the profession (and the country when needed).

7. Articles on nematode plant diseases not containing the word "nematode" or "nematodes" should be enriched by one of those terms (begun 1974).

8. Articles on lower plants (below the Spermatophyta) are enriched with the division or more general name, if not already in the title: e.g. Cyanophyta, Pteridophyta, algae, lichens, etc. (begun 1975).

9. Articles including new taxa of insects or plants are enriched with "new taxa" if the title does not include the word "new" (begun 1975).

10. Articles on plant varieties or cultivars not including those words are enriched with "varieties" (begun 1975).

11. Articles on diseases are enriched with names of the host and parasite or pathogen, if they are not mentioned in the title.

12. Geographic enrichment is used when it is needed to clarify the title meaning unless the journal title or language code indicates the area concerned. Terms for enrichment can be more specific than those from the list of geographic descriptors (subject terms), but the appropriate geographic descriptor must be added to the subject term field: e.g. Appalachia add United States, Warsaw add Poland, etc.

To enrich titles NAL indexers follow the "Rule of Three"; that is, enrichment terms for organisms, crops, chemicals, or other subject up to the number of three. If the subjects in an article exceed that number, a general term is used for enrichment if it is not already part of the title, e.g. an article on corn, wheat, millet, and oats may be enriched "cereals."

All enrichment terms are entered as part of the title field. They may be searched just as any other terms in that field.

Other Indexing Practices

Category Codes

The main subject or purpose of an article determines the assignment to a subject category. A general category is not used when a more specific category is available. In assigning categories the following subjects take precedence: 1. insect vectors, 2. diseases, 3. pesticides.

Double categories can be used on two different subjects, but since the item will then be printed twice in the Bibliography of Agriculture, for reasons of economy, the practice is limited. Most articles on pesticide residues in food will be indexed in 4560 and 1505, and articles on insects transmitting virus diseases to plants will be indexed in 4515 plus the appropriate insect category (4530-4545). Double indexing in other cases will depend on the length and scientific interest of the article.

If more than two kinds of crops or types of diseases are the subject of an article, the article is placed in a general subject category: e.g. plant physiology in 4030, plant diseases in 4520, animal diseases in 3005, insect pests and control in 4530. If two kinds are mentioned, the article may be double indexed if it is substantive, otherwise it too will be placed in a general subject category.

If many aspects of a crop are mentioned (physiology, culture, disease and insect pests) the subject category for culture is chosen: field crops in 4050, horticultural crops in 4055, miscellaneous crops in 4060, and forest trees in 3515. Crops are assigned to subject categories according to use: e.g., growing turnips as a vegetable is in 4055, turnips as forage is in 4050; oaks as shade trees go in 4055, while oaks as forest trees go

in 3515, etc. See section II-D for a complete list of subject categories.

Geographics

Geographical subject headings have been added since 1973. The list used at that time was compatible with the geographics used in cataloging records, but the list was not complete and was based on political boundaries only. Beginning in 1975, the list was expanded to include some areas larger than the political unit, and the list is expanded whenever needed. See section II-E for a complete list of geographics.

Translations

The Indexing Section takes articles translated into English, mainly from journals that are cover-to-cover translations, and adds the citation to the original article in the note field, if it is readily available. The only other tanslations indexed are those which accompany the original foreign language article (frequently Canadian or South African publications). The other translations on the CAIN tape are cataloging items.

Reviews and Bibliographies

Review articles and articles with substantial bibliographies (three or more average size pages of references) are tagged. Bibliographies have been noted since 1974 and reviews since 1975.

Corporate Authors

Authority files for corporate authors are maintained and used for both indexing and cataloging records. Therefore, one form of a corporate author entry may be expected on the CAIN tapes at any one time.

Few corporate authors are entered in the indexing records, however, except for those of the USDA, State Extension Service, State Experiment Stations, and FAO. These are entered and may be searched by state, with the exception of extension publications of those land-grant institutions which do not include the name of the state in their names: Auburn, Clemson, Purdue, and Rutgers.

Personal Authors

Authors of an item up to the number of ten are indexed. If there are more than ten, nine are listed and "et al" is generated by the computer in the tenth place of the author field.

Unit Record Authorities

The form of entry for corporate authors, personal authors, and serial titles follows Anglo-American Cataloging Rules. Abbreviated titles of serials are constructed according to the rules of the American National Standards Institute. MARC language codes are used.

Authors' names and specialized vernacular terms, such as Russian takyr (soil), appearing in other than Latin or Romanized alphabets, are transliterated according to the following systems:

1. Slavic languages in the Cyrillic alphabet including Russian, Ukrainian, Belorussian, Bulgarian, Serbian, Slovene, and Macedonian follow the Library of Congress system.
2. Chinese follows the Wade-Giles system.
3. Japanese follows the Hepburn system.
4. Korean follows the McCune-Reischauer system.

Diacritical marks in foreign names and titles are simply omitted, regardless of language.

Vocabulary Aids

Useful references for vocabulary choices are:

1. Agricultural/Biological Vocabulary, volume I and suppl., 1967 & 1968. Out of print.
2. Annual subject indexes of the Bibliography of Agriculture, particularly the 1969 index.
3. Oryx Press is soon to publish the Bibliography of Agriculture Thesaurus which will be useful for finding synonyms and related terms for searching.

C. CAIN Cataloging & FNIC Processing

By far the largest single source of records in the CAIN tapes is the work input by the NAL Indexing Section. But substantial numbers of CAIN records are also prepared by the Cataloging Section at the Library and by the staff at the Food and Nutrition Information and Educational Materials Center (FNIC). This section will discuss the scope of the materials handled by Cataloging and FNIC, as well as, some of the practices followed by these units that may affect online searching.

Food and Nutrition Information & Educational Materials Center

The Food and Nutrition Information and Educational Materials Center was developed cooperatively by the National Agricultural Library and the Food and Nutrition Service of the U.S. Department of Agriculture. The Center's primary function is to disseminate information on institutional food service and nutrition education.

The Center assembles and maintains a collection of materials useful in training personnel for food management of Child Nutrition Programs, including School Lunch, Breakfast and other nonschool programs. FNIC's collection encompasses the broader aspects of nutrition and large volume food services as well. Food service management and training, food processing and food technology, and certain areas of nutritionally-related disorders in humans (especially children) are among the topics covered by FNIC.

The materials in the Center include books, journal articles, pamphlets, government documents, special reports, proceedings, bibliographies, etc. In addition, FNIC maintains a collection of non-print media in the form of motion pictures, filmstrips, slides, games, charts, audiotapes and videocassettes. Materials of substantial interest to the school food service and nutrition education community are selected for inclusion in the printed catalogs of the Center; these items are also included in the CAIN tapes.

Items from the FNIC collection are indexed using a specialized controlled vocabulary that was developed for this collection. Many of these controlled subject terms are multi-word phrases that can be searched in their precoordinated forms directly, e.g. PLANT PROTEIN CONCENTRATES or SYNTHETIC FOODS.

An informative abstract, extract, or annotation is part of each FNIC record, and numerical subject category codes are also assigned to each item. (See page 79 for a complete list of FNIC category codes.) Users who anticipate heavy use of CAIN for searching the FNIC files may wish to acquire a copy of the controlled vocabulary used by the Center's indexers. It can be obtained directly from the Center, Room 304, National Agricultural Library, Beltsville, Maryland 20705. The subject sections of the FNIC catalogs can also be used to locate appropriate subject headings for online search strategies.

Media Retrieval.

Because FNIC indexes its items much more fully than the NAL Indexing Section indexes its materials, little use is made by FNIC of title enrichment--with the notable exception of audiovisual materials. The title of each piece in the Center's educational media collection is enriched with the term or terms denoting its format, e.g. USING STANDARDIZED RECIPES (FILM LOOP). These enrichment terms are extremely useful in trying to retrieve particular types of teaching aids.

The following terms are used for title enrichment by indexers at the Center:

Audiotape	Motion Picture
Cartoon	Phonodisc
Cassette Tape	Playing Cards
Chart	Poster
Coloring Book	Record
Crossword Puzzle	Show 'N Tell
Film Loop	Slide
Filmstrip	Study Print
Game	Transparency
Kit	Videocassette
Model	

Each of these terms may also appear in its plural form, and some of the terms may be more likely to appear in that form --e.g. slides and transparencies. Because these terms are part of the title field, they are keyworded as single word entries; so to search for a particular type of

media, one must use the same searching techniques as are employed in searching other title words.

NAL Cataloging Practices

Approximately 14,000 CAIN records are input by the Cataloging Section each year. These include cataloging records for periodical and other serial titles, monographs, translations, series analytics, and other such records for items that are entered into the catalogs at the Library.

The next few paragraphs will elaborate on some of the NAL cataloging practices that have an effect on retrieval of information from the CAIN tapes.

Call Numbers

Since 1966 NAL has used Library of Congress classification. Prior to that time the Library used its own classification scheme (See page 47 for a summary of the NAL scheme.) There are no plans for reclassifying the collections, so many of the serial titles that appear in the CAIN tapes--both as indexing and as cataloging records--will bear the old NAL call numbers.

Knowing the NAL call number for long-established titles can help in trying to search for publications from a given source such as State agricultural experiment or extension services. While governmental agencies and their publications exhibit the most frustrating proclivities toward name changes, call numbers tend to be rather more stable and, therefore, are a good way of searching for work issued by a given corporate source. For instance, 275.29 K13 with truncation will retrieve the items from Kansas State agricultural extension cataloged before 1966. One caution, however, must be observed when using this technique. The CAIN data base is a cumulative record only; therefore, any changes that a serial undergoes which does cause a new cataloging record to be created will be reflected in CAIN only from the time the new record is entered. Pre-existing records are not updated on the tape. The new serial record simply contains a note referring back to the old entry. The change is cataloged as a new item, but the previously assigned call number is retained. Thus, if two serials, A and B, combine to form a new title, C, which has a new call number, the old records for titles A and B will not be updated in the data base. To perform a complete

search, then, one must use the call numbers for both the old and the new titles.

A list of serials indexed in the CAIN tapes is planned for 1976. This will include NAL call numbers which may presently be found in Serials Currently Received by the National Agricultural Library (1974).

NAL call numbers are always entered on the CAIN tape with a space between the class number and the book number, e.g. 424.8 G47. LC call numbers, on the other hand, are entered without spaces except for a date as part of the number, e.g. SB351.P3P3 or TX739.C3 1971.

A lowercase "a" before an LC call number, or a capital "A" before an NAL call number, identifies a publication issued by the U.S. Department of Agriculture. Other special types of materials are similarly identified, e.g. "Fo" for folios, "j" for juvenile literature, and "R" for items in the rare book collection. These are all shown ahead of the call number.

Subject Headings

NAL adopted Library of Congress subject headings beginning in July, 1972. Prior to that time it had used National Agricultural Library Subject Heading List. All subject headings for cataloging records are entered into a separate unit record category (Descriptors in DIALOG, Subject Terms in ORBIT).

Subdivisions for a subject heading are entered as separate items in the record. Thus, the subject heading AGRICULTURE--ECONOMIC ASPECTS appears in the CAIN record as two headings: AGRICULTURE and ECONOMIC ASPECTS.

Series

Series statements are entered in cataloging records according to standard library practice. Such statements can appear in the CAIN unit record in either the Series field or the Notes field. A single series statement or the primary series if more than one is to be entered is placed in the Series field of the unit record. All additional series statements are entered in the Notes field.

The NAL Cataloging Section now does analytics for all the major agricultural experiment station series. Analytics are also done for major monographic series that fall within the defined scope of the NAL collection.

Translations

The Cataloging Section processes several hundred items each year for the NAL Translation Collection; over 2300 translations of book chapters, articles, etc., have been added since 1970. This Collection, and its handling, is separate from the indexing and storage of translated journals. The call number for an item in the Translation Collection is simply TRANSL plus a sequential accession number. In these records, the original language titles appear when available, as well as translated titles.

Titles and authors' names are entered exactly as given in the translation. Some variations, therefore, exist for items by any particular author. This is especially true of items in non-Roman alphabets because of variations in transliteration schemes. All diacriticals are omitted.

NAL CLASSIFICATION NUMBERS IN THE CAIN FILE

These apply to serials and monographs in series which have not been converted to the Library of Congress Classification introduced in 1966.

1 USDA publications
(Until November 1953 at which time subject classification preceded by the letter A was used. Use of "A" continued with changeover to LC classification in 1966.)

AGRICULTURE - U.S.

2 State agricultural reports
4 Agricultural societies
5 Agricultural congresses and conventions
6 Agricultural periodicals

AGRICULTURE - FOREIGN COUNTRIES

7 British America
8 Mexico,Central America and West Indies
9 South America
10 Europe
11 Scandinavia and Iceland
12 Netherlands
13 Belgium
14 France
15 Spain and Portugal
16 Italy
17 Switzerland
18 Germany
19 Austria, Hungary and Czechoslovakia
20 USSR, Finland and Poland
21 Balkan countries
22 Asia (except USSR)
23 Australasia
24 Africa
25 Other (Turkey, Philippines, Indonesia, etc.)
26 Tropical countries
27 Foreign congresses
28 International institutions
30 Agriculture in general

ANIMAL HUSBANDRY

40 Domestic animals: goats and rabbits
41 Veterinary medicine (Parasitic diseases in 436)
42 Horses
43 Cattle
44 Dairying
45 Sheep and wool
46 Swine
47 Poultry (wild birds in 413)

48 Dogs and pets
49 Livestock
50 Meat inspection

SOIL

54 Drainage
55 Irrigation
56 Soils
57 Fertilizers
58 Agricultural implements, machinery and processes

CROPS

59 Cereals
60 Forage crops
61 Seeds
64 Crops (see also special crops 59-61, 65-77)
65 Sugar
66 Sugar beet
68 Sorghum and misc. sugar plants
69 Tobacco
70 Hops
71 Drug and medicinal plants
72 Cotton
73 Fiber and textile plants
75 Potatoes
77 Misc. technical plants
78 Rubber
79 Farm pests and weeds

HORTICULTURE

80 Horticultural periodicals
Societies, boards and institutions
81 United States
82 British America
83 Latin America
84 Great Britain
85 Germany
86 Other European except USSR
87 Asia, Africa, the East and USSR
90 Horticulture in general
91 Vegetables
93 Fruits
94 Small fruits and nuts
95 Grapes
96 Floriculture
97 Gardens
98 Landscape art, parks, etc.
99 Forestry

AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS

100 United States
101 British America
102 Latin America
103 Great Britain
104 Scandinavia and Iceland
105 Belgium, Netherlands, France, Italy, Switzerland, Spain, Portugal, Germany, Austria, Hungary, and Czechoslovakia
106 USSR, Finland, Poland, Bulgaria, Rumania, Greece, and Yugoslavia
107 Asia
108 Africa
109 Australasia and Oceania

UNITED STATES PUBLIC DOCUMENTS

150 State Department
156 Dept. of the Interior
157 Dept. of Commerce
158 Dept. of Labor
166 Farm Credit Administration and Farmer Cooperation Service
173 Misc. agencies

270-
273 Statistics

275-
276 Education (includes extension)

ECONOMICS

277 Economic history
278 Economic geography
279 Conservation of natural resources
280 Economics: Cooperation, marketing and planning
281 Agricultural economics
282 Land and rent
283 Labor and wages, etc.
284 Finance
286 Commerce
287 Boards of trade, chambers of commerce and exchanges

TECHNOLOGY

288 Roads
290 Civil engineering
292 Water supply
293 Sewerage
294 Mining, metal working and mineral industries
295 Refrigeration and cold storage
296 Architecture
297 Manufactures

298 Milling
300 Wood preservation, seasoning and drying (see also 464.07)
301 Wood distillation and wood waste utilization
302 Paper
303 Leather and fur industries
304 Textiles
305 Rubber
306 Paints, dyes and bleaches
307 Fats and oils, soap, lubricants and waxes
308 Essential oils, perfumery and flavoring extracts
309 Misc. manufactures
321 Home economics
325 Mathematics

PHYSICAL SCIENCES

330 Science - general reports and research
331 Geography
332 Photography
333 Aeronautics
334 Physics
335 Electricity, electronics

340-
346 Meteorology

CHEMISTRY

Periodicals and societies
381 U.S. and Canada
382 Great Britain
383 French
384 German
385 Other

386 General works
387 Analysis
388 Chemical technology
389 Food
390 Fermentation, enzymes
391 Toxicology
395 Agricultural chemistry
396 Pharmacy (veterinary drugs in 41)
398 Mineralogy
402 Paleontology
403 Geology
406-
407 Geological surveys
409-
410 Natural history
411 General zoology
412 Mammalia
413 Ornithology
414 Fishes

ENTOMOLOGY

420 Societies
421 Periodicals
422 General works
432 Economic entomology, insecticides
424 Apiculture (see also with prefix BEE)
425 Sericulture
427 Coleoptera
428 Diptera

436 Worms and animal parasites
439 Protozoa
440 Microscopy
442 Biology
443 Evolution, genetics and heredity
444 Comparative anatomy and physiology
447 Human anatomy, physiology and histology
448 Medicine (Parasitic diseases in 436)
449 Hygiene

BOTANY

450 Periodicals
451 Societies, boards, institutions
452 Systemic and descriptive catalogs
Geographical
459 Europe
460 Asia

462 Fungi
463 General works, textbooks and handbooks
464 Phytopathology

SCIENTIFIC PERIODICALS

470 American
472 English
473 French
474 German
475 Other

LEARNED SOCIETIES

500 United States
501 Great Britain
502 Scandinavia and Iceland
503 Netherlands
504 Belgium
505 France
506 Spain and Portugal
507 Italy
508 Switzerland
509 Germany

510 Austria, Hungary, Czechoslovakia, and Yugoslavia
511 USSR and Finland
512 Greece, Rumania, Bulgaria, Poland and Albania
513 Asia
514 Australasia
515 Africa
516 Latin America
517 British North America

FICHE
FILM
TRANSL

Prefixes to call numbers besides "A" for USDA publications
BEE or BEE CULTURE formerly in Bee Culture Library

FO or FOLIO	Folio size materials
MAP	Maps
R	Rare books

These prefixes have a space between them and the class number. The "A", meaning USDA publications, does not.

For classification numbers used since 1965, see the Library of Congress classification scheme.

D. Category Codes (1972-) *

General Agriculture & Rural Sociology

0505 General agriculture and rural sociology

General description of U.S. and world agriculture. Agricultural history in general: prehistoric, ancient, medieval and modern. Biographies, geographies, maps, atlases, travels.

Education: teaching, extension, demonstration, and advisory work. Short courses, correspondence courses, schools--all levels. TV, radio, and agricultural journalism.

General proceedings, annual reports and acts of agricultural institutions, societies, cooperative associations, and chambers of agriculture. Specific kinds of cooperative associations go with subject.

Techniques and methods of agricultural research.

Agricultural meteorology and climate in general.

Any of above go with a specific subject category as appropriate.

Human ecology, social psychology, social effects, social institutions. Rural organization and movements, leadership, farmer political power. Health, welfare, etc., affecting family life. Rural-urban relations. Population migration to urban areas. Social aspects of migratory and contract labor, women as laborers, sharecroppers, etc. Cost and standard of living.

For home demonstrations and home economics see 1515.

Includes any agricultural item too general for other categories.

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*See Appendix D for a summary of NAL Category Codes (1972 -)

Agricultural Economics

1005 General agricultural economics and land economics

General description of U.S. and world agricultural economies. Agriculture and industry - economic relations. Economic associations, history, education, biographies, etc.

Land settlement and colonization, rent, valuation. Land classification, utilization, multiple use. Recreational use of farm land, shifting cultivation, conversion of land to non-agricultural uses, rural-urban fringe, land zoning. Tenure, farm mergers, consolidation of holdings. Land or agrarian reform. Regional planning involving land only.

For location theory see 1030.

For forest land use see 3510.

1010 Agricultural administration and management

Organization and administration of national and international agriculture in general; public relations, personnel on local, regional, central, public, governmental, non-governmental, international levels.

Farm management: operation of farms to obtain maximum amount of continuous net income. Alternative systems of farming, budgeting, accounting, cost and return planning, input-output analysis, programs of adjustment, integration, etc.

Collective farming, state farms, contract farming, cooperative farming, corporation farming, part-time farming, share farming, tenant farming, etc.

Machine tractor stations, repair and technical stations not including purely sociological or technical apects.

Labor: requirements and productivity. Economic aspects of migratory and contract labor, women as laborers, share-croppers, unions, etc.

Agribusiness, vertical and horizontal integration of farming. Not to include labor and management problems of processing industry unless it is part of agribusiness.

For forest management see 3510.

For actual costs and returns see 1015.

1015 Agricultural production costs and returns

General agricultural finance. Cost factors: land, capital, materials, labor (wages, incentives, bonuses), overhead; credit and interest rates; taxes; insurance: fire, accident, unemployment, social security, health, etc. Pesticides, fertilizer and agricultural equipment costs as they relate to agricultural production (otherwise in 4560, 6010, and 5510).

Selling, processing, and distribution costs; farm income; return on farm investment.

Farm losses from the economic aspect. Not to include processing industries costs and returns unless they are part of agribusiness.

For forestry costs and returns see 3510.

For cost and return planning see 1010.

1020 Agricultural production distribution (farm products)

Supply and demand, including affecting factors as consumer preferences, consumer purchasing power, etc.

Prices: determination, control, cycles, fluctuations, inflation, indexes, trends, etc. Price support programs and subsidies.

Domestic trade, marketing, transportation, advertising; foreign trade, import quotas, commodity agreements; surplus disposal.

For marketing cost and return material as a part of agribusiness or farmer operations see 1015.

For forest products see 3520.

For fertilizer as a product see 6010.

For pesticides as a product see 4560.

For farm equipment as a product see 5510.

1025 Statistical data and methodology

Discussions of agricultural statistics. Statistical methods and theory as applied to agriculture, in general; as applied to specific subjects, place in that subject category: e.g. statistical methods of plant genetics in 4025.

Includes compilation of statistical data on crops, livestock, products, acreage and area, etc., that would support management and policy decisions.

For forestry statistics see 3510

1030 Outlook, policies, programs and legislation

Productive capacity of agriculture. Population and food supply problem and programs. Control of production, production goals, surplus situation.

Agricultural relief and reconstruction, foreign aid, and technical assistance programs.

Soil bank program, agricultural conservation programs, rural development, subsidies.

Situation and outlook of agricultural industries (rubber, coffee, poultry, etc.) from an economic point of view. Large scale planning, location theory.

General and specific agricultural legislation; all legislation is here, but may be double indexed to the specific subject category.

Consumer Protection and Nutrition

1505 Consumer protection

Consumer oriented research on food and textiles and on other agricultural products through the processing stages, not on the manufactured product (e.g., cigarettes)

Agricultural products: grading, inspection, regulation, standardization, quality control. Purity, contamination, adulteration, decontamination, residues, food poisoning, spoilage, fraud from the point of view of the consumer.

Includes equipment for grading and inspection of food.

Includes contamination of fish as food.

Any of the above aspects concerning feed are in 2035.

For pesticide contamination double index to 4560.

For other aspects of agricultural products see categories 2005-2030.

For other aspects of food research see 1510.

1510 Human nutrition

Metabolism and utilization of nutrients. Nutrient requirements. Relation of nutrition to physiology.

Food: nutritive value, vitamin research. Food consumption (diet), food habits, and fads, etc. Home and institutional cookery.

Nutritional deficiencies, malnutrition, human diet in relation to health and disease.

Includes nutrition research on laboratory animals.

For livestock nutrition research see 2515.

1515 Home economics

Clothing and textiles, home furnishings and decoration, household accounts, household equipment; both rural and urban. Family living and management practices. Home demonstrations.

For family and community relationships see 0505.

Agricultural Products

2005 Agricultural products - general

General material relating to more than one category of products and specific products which fall in no other groups (e.g., beverages, condiments, honey and beeswax, rubber, silk, bamboo, hops, fish as food, beer or margarine when ingredients are not mentioned, etc.)

Industrial utilization. Chemurgy. Analysis and composition. Processing: preparation methods such as pasteurizing, curing, canning, dehydrating, freeze-drying, freezing, preserving, irradiation, etc. Home and industrial processing.

Care, storage, refrigeration, and sanitation procedures for food and non-food agricultural products. Rodent control measures. Biochemistry of stored products.

For insect pests see 4550.

For effect of sanitation procedures on humans see 1505

For cookery see 1510.

For storage diseases and plant products see categories 4505-4520.

2010 Dairy products — Same as 2005, except 1st paragraph

2015 Livestock products — Same as 2005, except 1st paragraph
Includes slaughtering.

2020 Poultry products — Same as 2005, except 1st paragraph
For eggs for hatching see 2520.

2025 Field crop products — Same as 2005, except 1st paragraph

2030 Horticultural products — Same as 2005, except 1st paragraph

2035 Feed products — Same as 2005, except 1st paragraph
Includes silage, hay, meals, fodder, fish as feed, etc.

Includes all aspects of consumer protection 1505 as it applies to feed.

For effect of feed on animal see 2515.

Animal Science

2505 General and miscellaneous animal husbandry

Includes cattle, buffalos, camels, yaks, llamas, reindeer, horses, mules, sheep, goats, swine; poultry: chickens, turkeys, ducks, and geese; dogs, cats, rabbits, laboratory animals, fur animals pen raised; fish culture as part of farm operations, not fish hatcheries.

Production and care of domestic animals. Rearing, judging, testing, training, housing; branding and other identification; livestock shows; sexing, predators of livestock.

For construction of animal housing see 5505.

For animal breeding, artificial insemination, etc. see 2520.

2510 Livestock biology

Biology, anatomy, cytology, histology, morphology including teratology, physiology including metabolism, biochemistry, ecology, behavior, paleontology. Environmental biology, external influences on biological processes. Biology of rumen microorganisms.

For external influences with harmful effects see 3020.

For biological aspects of diseased animals see the appropriate disease category.

For biological aspects of reproduction see 2520.

Includes physiology of nutrition and effect of rumen microorganisms and other digestive tract organisms on nutrition.

2515 Livestock feeding

Feeds and animal nutrition; nutritive value of feeds, feed formulas, feedlots, feed supplements; effects of feeding.

For biological effects of feeding see also 2510.

2520 Livestock breeding

Breeds, types, varieties; fertility (which is often mentioned as "reproduction"), sterility, artificial insemination, genetics, pedigrees; parturition, egg hatching, predetermination of sex, sex reversal, twinning. Estrus; pregnancy; semen; effects of breeding; physiology of reproduction.

Veterinary Medicine

3005 Veterinary medicine

General; as a profession, societies, education; dehorning, castration, surgery, anaesthesia; diagnostic techniques; animal quarantine, health problems, sanitation inspection of farm and slaughterhouse.

Any of the above go with a specific subject category as appropriate.

General articles on animal diseases go here.

3010 Infectious and parasitic diseases

Contagious diseases: bacteria, viruses, fungi (mycoses), Rickettsia, Mycoplasma, pleuropneumonia-like organisms, protozoa; Parasitic diseases: parasitic worms, such as trematodes, nematodes, helminths, flukes, etc. Vaccines, immunization, immunogenicity, antigens, antibodies: causes, control, diagnosis, prevention, transmission, treatment.

Double index insect vectors to 4555.

3015 Non-infectious diseases

Physiological, metabolic, nutritional (deficiency diseases), hereditary; neoplasms: causes, control, diagnosis, prevention, treatment, allergy.

For nutritional deficiences see also 2515.

3020 Miscellaneous diseases and injuries

Diseases and injuries caused by physical agents (including radiation), chemical agents, toxic substances, pesticides, poisonous plants, foreign bodies, vices (cannibalism, tail biting, feather picking, etc.), etc.

For effects of environmental stress see also 2510.

Forestry

3505 Forestry - general

Associations, history, education, social and economic aspects of forestry as a whole. Techniques and methods of forestry research. Specific research goes with subject.

Forest influences: effects upon water supply, soil, climate, and health resulting from the presence of forests. Includes shelterbelts and windbreaks. Watershed management.

Forest fire research: prevention and control.

Injuries caused by man, animals, weather; pollution. Includes methods of prevention and control: natural and biological, silvicultural, physical and mechanical, chemical.

For nematodes as pests and other diseases of forest trees (except injuries) see 4505-4520.

For weeds and parasitic plants of forest trees see 4525.

For insect pests of forest trees see 4545.

3510 Forest economics and management

Business economics of forestry both domestic and foreign. Administration and organization of forest enterprises. Forest finance, valuation, and statistics. Land-use policy, including multiple use for maximum efficiency, management of recreational resources on forest lands, such as parks; includes taxation, regulation and legislation, cost and return aspects, consolidation of holding, ownership, labor.

National forest resources, experimental forests, private forests, farm woodlands. Forest engineering. Forest conservation.

Forest mensuration: systems and units of measurement of trees, stands, timber; increment and yield tables. Site index and site quality. Surveying and mapping; aerial surveys; photogrammetry.

3515 Silviculture

Care of forest trees. Silvicultural systems, artificial regeneration, breeding and genetics, seed productions. Timber stand improvement, minor forest husbandry including Christmas trees and forest nurseries. Prescribed burning, killing, afforestation and reforestation.

For study of forest soils see 6005.

For forest fertilizers see 6010.

For forest drainage and irrigation see 6020.

For taxonomy, ecology, morphology, anatomy (except wood anatomy see 3520), and cytology of forest trees see 4010-4020.

For physiology and biochemistry of forest trees see 4045.

For range management see 4050.

For silvicultural equipment see 5510.

3520 Forest industries

Harvesting, logging, transportation, sawmills, and equipment. Primary and secondary processing. Timber manufacturing industries and products, pulp and paper industries, bark products, Christmas trees, and other minor forest products. Logging residues. Veneers, plywood, and built-up-stock, chemical products and distillates, naval stores. Honeycomb cores, sandwich construction materials, plastic laminates, joints and fastenings; general utilization. Grading, seasoning, control of decay (wood rotting fungi), preservation and treatment, painting and fireproofing.

Trade, marketing, prices.

Wood technology: research studies on wood in all its aspects. Identification and characteristics, structure and chemistry, mechanical and physical properties. Cellulose and lignin research whether wood product or general.

For insect pests of forest products see 4545.

For pulp from grasses, bagasse, castor bean, bamboo, etc. see 2005.

Plant Science

4005 General plant science

Associations, history, education; introduction of plants; arboretums, herbariums, botanical gardens, notable trees; techniques and methods of botanical research. Specific research goes with subject. Ethnobotany; botanical explorations; conservation of plants.

Any of the above go with a specific subject category as appropriate.

4010 Plant taxonomy and geography

Orderly classification of plants, including mechanisms underlying speciation and related processes. Plant geography, floras, cytotaxonomy, chemotaxonomy, and nomenclature. Paleobotany and fossil pollen. Checklists of plants.

4015 Plant ecology

Interrelationships of plants with their environment. Includes forest ecology (forest types), indicator plants, plant associations, vegetation.

For environmental biology see 4030-4045.

4020 Plant morphology, anatomy and cytology

Includes histology, teratology, ultrastructure.

Includes forest trees.

For anatomy of wood see 3520.

4025 Plant genetics and breeding

Includes cytogenetics. Breeding for disease resistance; breeding for insect resistance. Double index breeding for disease or insect resistance.

For forest tree genetics and breeding see 3515.

For physiology of plant reproduction see 4030-4045.

4030 Plant physiology and biochemistry - general

Growth and growth regulators. Nutrition and nutritional deficiencies. Pollination, metabolism, transpiration, etc. Physiological effect of environmental factors; hardiness, etc. Tissue culture.

Includes miscellaneous economic plants. (For list see 4060)

Includes any plants of unknown use.

General material relating to more than one category of crops.

For deficiency diseases see 4520.

4035 Physiology and biochemistry of field crops

Same as 4030.

For list of plants see 4050.

4040 Physiology and biochemistry of horticultural crops

Same as 4030.

For list of plants see 4055.

4045 Physiology and biochemistry of forest trees

Same as 4030.

4050 Field crops - culture (from planting to harvesting)

Agronomy; varieties, and yields. Crop rotation. Management of ranges, pastures and meadows, grazing practices. Defoliants as harvesting aid.

Grain crops, forage crops, grasses, edible oil crops, cotton and other fiber crops, sugar crops, tobacco, peanuts, soybeans and other field crops.

A number of crops can be placed here or in horticultural crops depending on their use: e.g., broadbeans, olives, coconuts, turnips, beets, etc.

Grazing practices and range management may be double indexed to 2515.

4055 Horticultural crops - culture (from planting to harvesting)

Horticulture; varieties, and yields. Crop rotation. Orchards, nurseries, gardens. Landscaping; highway beautification. Defoliants as harvesting aid.

Citrus, tropical, subtropical, deciduous, and small fruits; nut crops; vegetable crops; root and tuber crops (includes cassava). Shade trees and ornamental plants. Turf and golf greens, roadside plantings.

Includes harvesting of wild berries, nuts, mushrooms, etc.

4060 Miscellaneous economic plants - culture (from planting to harvesting)

Varieties and yields.

Beverage plants, flavoring, essential oil, hops, bamboo, rubber plants, pigment, tannin, tung oil and other industrial oil plants, drug plants, divinatory plants, plant sources of insecticides, honey plants, etc.

There is no general category for culture so if more than one crop category is mentioned the item is assigned to the most important category or each crop is indexed.

Plant Diseases, Insect Pests, and Control

4505 Plant fungus diseases and control

Includes diseases in storage.

Includes forest trees.

Double index when insect vector is known.

For wood rotting fungi see 3520.

4510 Plant bacterial diseases and control

Includes diseases in storage.

Includes forest trees.

Double index when insect vector is known.

4515 Plant virus diseases and control

Includes diseases in storage.

Includes forest trees.

Includes mycoplasmas.

Double index when insect vector is known.

4520 Miscellaneous plant diseases, injuries and control

Nematodes (includes nematodes of forest trees), physiological diseases, deficiency diseases; injuries caused by weather and equipment; plant protection, including irrigation and wind machines; plant quarantine; animal pests (other than insect) of plants; pesticide toxicity to plants; radioactive contamination of plants; nematicides, rodenticides, molluscicides, and other agents used in control. General material on all diseases and pests of a plant or plants.

For free-living soil nematodes see 6005.

For injuries of forest trees see 3505.

Pollution damage may be double indexed to 6505.

Includes items covering more than one disease category.

4525 Weeds and weed control

Occurrence and distribution of weeds.

Weed control: chemical, cultural, and biological. Parasitic and poisonous plants.

For effect of poisonous plants on animals see 3020.

For physiological effect of herbicides see also 4030-4045

For toxic effects of herbicides on organisms other than weeds see appropriate specific categories and double index as needed.

4530 Insect pests and control - general, and miscellaneous plants

General items where the name of the host is not given and also where the host is any plant not covered in catetories 4535 (field crops), 4540 (horticultural crops), or 4545 (forest trees and products). Includes items covering more than one crop category.

Insects as pests and their control: biological, chemical, cultural, integrated, natural, etc. Insect resistance to insecticides; toxicity of pesticides to insect pests; insecticides, acaricides, chemosterilants, attractants, repellants, hormones, and radiation sterilization; insects as vectors of diseases; host resistance.

Plant quarantine regulations covering insects only, otherwise in 4520.

See also 4535, 4540, 4545.

For physiology of insect pests see also general entomology 5005.

For equipment for pest control see 5510.

4535 Insect pests and control - field crops

For partial list of field crop types see 4050. Otherwise as 4530.

4540 Insect pests and control - horticultural crops

For partial list of horticultural crop types see 4055. Otherwise as 4530.

4545 Insect pests and control - forest trees and wood products

See 4530.

4550 Insect pests and control - products

Pests attacking stored products and processed commodities, in the household, industry, warehouses, and on the farm, including control by any means.

See 4530.

For insect pests of forest products see 4545.

4555 Insect pests and control - animal and man

Pests attacking man, domestic animals, birds, and wildlife, including control by any means.

See 4530.

Double index insects as vectors of disease to the disease if livestock are involved.

4560 Pesticides - general

General items on pesticides which cover more than one specific group of pesticides and items which mention a pesticide or pesticides but no specific host or insect.

Industry, technology, prices.

Toxicity and harmful side effects to man, birds, wildlife, fish, beneficial insects.

Double index toxicity to honey bees to 5015.

Residues and tests for residues. Double index residues in food to 1505, in feed to 2035.

For toxicity and harmful effect to insects pests see 4530-4555.

For toxicity and harmful effect to livestock see 3020.

For toxicity and harmful effect to plants see 4520.

If a pesticide is not in a 4505-4555 or 3020 category it is placed here and double indexed as needed.

Entomology

5005 General entomology

Biology, anatomy, cytology, histology, morphology including teratology, genetics, physiology including metabolism, biochemistry, ecology. General pathology. Insects other than honey bees as pollinators. Articles on pollination may be double indexed to plant physiology categories 4030-4045. Paleoentomology.

Includes: Insecta, Myriopoda (Diplopoda, Pauropoda, Chilopoda, Symphyla), Arachnida, Isopoda (terrestrial only), and Onychophora.

5010 Taxonomic entomology

Systematic arrangement of insects into a system which exhibits their relationship to each other and their places in a natural classification. Includes descriptive and geographic entomology.

5015 Apiculture and sericulture

Honey bee culture, breeding, biology, pests, and pathology; honey bees as pollinators. Includes Apis mellifera (or mellifica), A. dorsata, A. florea, A. indica, A. mellifera adansonii (African bee), etc.

For products of the hive see 2005.

Silkworm culture, breeding, biology, and pathology. Includes Bombyx mori, Anthereae pernyi, Samia cynthia ricini, etc.

For silk see 2005.

Includes beekeeping and silkworm culture equipment.

Agricultural Engineering

5505 Agricultural engineering and farm structures

General articles on agricultural engineering: associations, history, education, biographies, etc.

Structures: design and construction of structures such as farmhouses, utility buildings, including barns, silos, sheds, greenhouses, plastic structures, and others. Foundations, maintenance. Farm beautification. Drainage and irrigation structures. Water supply systems. Sewage and waste disposal systems. Walls and fences. Structural equipment, materials, and supplies.

Excavation and earth moving equipment, hoisting and conveying equipment.

Safety engineering: fire-fighting equipment, fire-detection equipment, accident prevention, safety devices.

For forest fire-fighting equipment see 3505.

Power sources: electrical, electronic, sonic, solar, gas, water, wind, thermal, mechanical. Capacitors, batteries, nuclear power conversion. Rural electrification, public utilities, heating, lighting, power plants, telephones. Electrical and electronic engineering.

For use of wind machines in frost protection see 4520.

5510 Farm equipment

Machines and machine elements for field preparation, planting, fertilizing, cultivation, harvesting, loading, transportation, related handling and storage, including container and packaging equipment and other processing equipment used on the farm. Pest and disease control equipment, including sprayers and dusters. Livestock and dairy equipment. Special purpose equipment, tractors, accessories, etc. Mechanical engineering. Drainage and irrigation equipment.

Includes repair and maintenance.

For logging equipment see 3520.

For beekeeping equipment see 5015.

For equipment for processing farm products see 2005-2035.

For laboratory or research equipment see the specific subject category.

Soil and Water Resource Management

6005 Soil Science

Soil physics: soil mechanics; physical properties of soil, structure, porosity, moisture, aeration, temperature, etc.

Soil chemistry and mineralogy: electrolytes, clay minerals, base and anion exchange, chemical composition. Fixation of phosphorus, potassium, etc. Nitrogen, sulfur, and other elements from precipitation; chelates, frits. Leaching, soil testing. Saline soils, salts in soils, hydrogen-ion concentration.

Soil biology; soil fauna, including bacteria, fungi, protozoa, and nematodes. Microbiological activity; decomposition of organic matter. Enzymes, nitrification, denitrification, ammonification, nitrogen fixation, legume inoculation, nitrogen fixing bacteria: Rhizobium, Azotobacter, etc. when not related to plant physiology. Soil-plant-animal relationships.

Soil classification and surveys: genesis, formation, intrinsic properties. Systematic grouping of soils into categories by constituents of types. Soil surveys and mapping.

Includes forest soils.

For soil borne pathogens see the specific disease category.

For pesticides in soils see 4560.

6010 Soil improvement materials

Organic and inorganic materials applied to soil and water to provide plant nutrients and to increase growth and yields. Chemical fertilizers: nitrogen, phosphorus, and potassium; macronutrient and micronutrient element materials. Bacterial fertilizers, including azotobacterin and phosphorobacterin. Manures and composts. Soil conditioners and amendments; green manures and cover crops. Industrial waste as fertilizers, sewage, sludge. Foliar diagnosis and placement methods for fertilizers.

Fertilizer industry, technology, statistics, prices and trade.

Includes forest fertilizing.

Includes tables of yields.

Sewage or waste water irrigation goes here or in 6020 according to main use.

For effect of fertilizer on plant growth and development see 4030-4045.

For mulches see 6015.

6015 Soil resources and management

Soil as a natural and an economic resource. Preservation of soil resources and conservation in general; maintenance and improvement of fertility and productivity of soils. Protective measures and technical practices designed to prevent or reduce soil erosion and soil depletion; land reclamation, terracing, contouring, polders, tillage, fallowing, mulching, dry farming.

For soil pollution see 6505.

6020 Water resources and management

Hydrology as related to agriculture. Water supply, conservation, quality, and management practices. Snow surveys. Design and methods of drainage, irrigation, desalinization, flood control.

Includes forest irrigation and drainage.

For drainage, irrigation and flood control equipment see 5510.

For drainage, irrigation and flood control structures see 5505.

For water pollution see 6505.

General Natural Resources and Environmental Pollution

6505 General natural resources and environmental pollution

General natural resources, too broad for 6015 or 6020. General recreational use.

Animal wastes, sediment, plant nutrients, inorganic salts and minerals, forest and crop residues, agricultural processing wastes, smokes, dusts, other air pollutants, eutrophication.

All pollution goes here--not in 6015 or 6020.

For utilization or recycling of agricultural wastes or residues see specific subject category or double index.

For pesticides pollution see 4560 or double index.

Auxiliary Categories

7005 Life sciences

7505 Physical sciences and mathematics

8005 Chemistry

8505 Technology

9005 Economics and administration

9505 Social sciences and humanities

9705 Information science

1970–1971 Category Codes

05	Agriculture (general)
10	Agricultural economics and rural sociology
15	Agricultural products (economics and technology)
20	Animal sciences
25	Chemistry
30	Engineering
35	Entomology
40	Food, human nutrition, and home economics
45	Forestry
50	Life sciences (general)
55	Natural resources (general)
60	Pesticides (general)
65	Physical sciences (general)
70	Plant science
75	Social science (general)
80	Soils and fertilizers
85	Water resources
90	Reference materials

FNIC Category Codes

1505 Consumer Education

Consumer Economics, Consumer Protection, Open Dating of Food

1510 Nutritional Science and Nutrition Education

Diets, food analysis, food and/or nutrition related diseases or disorders, food habits, food science, health, malnutrition, nutritional surveys, general works on nutrition education

1520 History

Historical works tracing the history of food programs, general works on foods and the food service industry, food problems

1525 Food Standards and Legislation

Food grades, food standards, labeling, food and nutrition related legislation

1530 Management and Administration

Administration, Computer applications, Contracts, Financial management, Food Service management, Personnel Management, Marketing, Food Preference Surveys, Public Relations

1535 Education and Training

Adult Education, Career Education, Curriculum, Educational Planning, Educational Programs, Audiovisual Aids, Teaching Techniques, Personnel Training, Inservice Education, Vocational Guidance

1540 Menu Planning

Cycle Menu, Menu Design, Meal Management, Automated Menu Planning

1545 Food Preparation and Production

Quantity Food Preparation, Food Delivery Systems, Weights and Measures, Merchandising

1550 Equipment

Cooking Equipment, Cleaning Equipment, Facilities Planning and Design, Waste Disposal Equipment, Equipment Standards, Equipment Storage

1555 Sanitation and Safety

Food Sanitation, Equipment Sanitation, Pest Control, Hygiene, Safety, Accident Prevention, Food Borne Illness

1560 Food Technology

Food Packaging, Food Processing, Food Preservation, New Products

1565 Programs-General

International, National, State, and Local Programs, Food Programs, Federal Programs

1570 Recipes

Cookery native to a specific country or locale, the art of cooking, recipes

1575 Reference Materials

Directories, Dictionaries, Statistical Data, Food Composition Tables, Information Science

1580 Purchasing, Receiving and Storage

Care and Handling of Food, Food Selection, Food Storage, Food Delivery, Purchasing of Food and Equipment

E. Geographic Descriptors

B OF A GEOGRAPHICS
* added 1975
\# form of entry changed

Abyssinia use Ethiopia
Aegean Islands use Greece
Africa*
Afghanistan
Alabama
Alaska
Albania
Algeria
America*
American Samoa
Andorra*
Antarctica*
Angola
Argentina # (was Argentine Republic)
Arizona
Arkansas
Aruba use Netherlands Antilles
Asia*
Australia
Austria
Azores*
Bahamas*
Bahrain
Balearic Islands*
Balkans*
Bangladesh
Barbados*
Basutoland use Lesotho
Bechuanaland use Botswana
Belgian Congo use Zaire
Belgium
Belize use British Honduras
Bermuda*
Bhutan
Bolivia
Botswana
Brazil
British Guiana use Guyana
British Honduras
British North Borneo use Malaysia
British Solomon Islands*
British Somaliland use Somali Republic
Brunei # (was Borneo)
Bulgaria
Burma
Burundi
California
Cambodia
Cameroon # (was Cameroun)
Canada
Canary Islands*
Cape Verde Islands*
Caroline Islands*
Celebes use Indonesia
Central African Republic
Central America
Ceylon use Sri Lanka #
Chad
Chile
China

Colombia
Colorado
Congo
Congo (Brazzaville) use Congo
Congo (Kinshasa) use Zaire #
Connecticut
Costa Rica
Cuba
Cyprus
Czechoslovakia # (was Czechoslovak Republic)
Dahomey
Delaware
District of Columbia*
Denmark
Dominican Republic
Dutch Guiana use Surinam
East Africa Protectorate use Kenya
East Indies use Indonesia
East Pakistan use Bangladesh
Ecuador
Egypt use United Arab Republic
El Salvador*
England*
Equatorial Guinea*
Ethiopia
Europe*
Fernando Po use Equatorial Guinea
Fiji
Finland
Florida
France
French Guiana*
French Sudan use Mali
French Territory of Afars and Issas*
French Togoland use Togo
Gabon
Galapagos Islands*
Gambia
Georgia
German East Africa use Tanzania
Germany (Democratic Republic)
Germany (Federal Republic)
Ghana
Gold Coast use Ghana
Great Britain
Greece
Guam*
Guatemala
Guinea
Guyana
Haiti
Hawaii
Honduras
Hong Kong
Hungary
Iceland
Idaho
Illinois
India
Indiana
Indonesia
Iowa
Iran
Iraq
Ireland*
Ireland, Northern use Northern Ireland
Israel
Italian Somaliland use Somali Republic

Italy
Ivory Coast
Jamaica
Japan
Java use Indonesia
Jordan
Kansas
Kentucky
Kenya
Khmer use Cambodia*
Korea (North)*
Korea (South) #(was Korea)
Kuwait
Laos
Lebanon
Lesotho
Liberia
Libyan Arab Republic
Liechtenstein*
Louisiana
Luxembourg
Madagascar use Malagasy Republic
Maine
Malagasy Republic
Malawi
Malaya use Malaysia
Malaysia
Mali
Malta
Mariana Islands*
Maryland
Mascarene Islands*
Massachusetts
Mauritania*
Mauritius
Melanesia*
Mexico
Michigan
Micronesia*
Minnesota
Mississippi
Missouri
Monaco*
Mongolia # (was Mongolian People's Republic)
Montana
Morocco
Mozambique
Muscat and Oman use Oman*
Nebraska
Nepal
Netherlands
Netherlands Antilles
Netherlands East Indies use Indonesia
Nevada
New Caledonia*
New Guinea use Papua and ...*
New Hampshire
New Hebrides*
New Jersey
New Mexico
New York
New Zealand
Nicaragua
Niger*
Nigeria
Niue Island use New Zealand
North America*
North Borneo use Malaysia

North Carolina
North Dakota
Northern Ireland
Northern Rhodesia use Zambia
Norway
Nyasaland use Malawi
Oceania*
Ohio
Oklahoma
Oman*
Oregon
Pakistan
Palestine use Israel
Panama
Panama Canal Zone*
Papua and New Guinea*
Paraguay
Pennsylvania
People's Republic of Mongolia use Mongolia
Persia use Iran
Peru
Philippine Islands
Poland
Polynesia*
Portugal
Portuguese Guinea*
Puerto Rico
Qatar*
Reunion*
Rhode Island
Rio Muni use Equatorial Guinea
Rhodesia
Romania
Ruanda-Urundi use Burundi
Rumania use Romania
Rwanda
Ryukyu Islands
Samoa, American use American Samoa
Samoa, Western use Western Samoa
Sardinia use Italy
Sao Tome and Principe*
Saudi Arabia
Scandinavia*
Scotland
Senegal
Seychelles*
Siam use Thailand
Sicily use Italy
Sierra Leone
Sikkim*
Singapore
Solomon Islands use British ...
Somali Republic
Somalia use Somali Republic
South Africa
South America*
South Carolina
South Dakota
South West Africa
Soviet Union use USSR
Spain
Spanish Guinea use Equatorial Guinea
Sri Lanka # (was Ceylon)
Straits Settlements use Singapore
Sudan
Sulawesi use Indonesia
Sumatra use Indonesia
Surinam
Svalbard use Norway

Swaziland
Sweden
Switzerland
Syria
Tahiti*
Taiwan
Tanganyika use Tanzania
Tanzania
Tennessee
Texas
Thailand
Tobago use Trinidad and Tobago
Togo
Transjordan use Jordan
Trinidad use Trinidad and Tobago
Trinidad and Tobago
Tunisia
Turkey
USSR
Uganda
Union of South Africa use South Africa
United Arab Republic
United States
Upper Volta
Uruguay
Utah
Venezuela
Vermont
Vietnam (North)*
Vietnam (South) #(was Vietnam)
Virgin Islands*
Virginia
Wales
Washington*
West Indies*
West Irian use Indonesia
West Pakistan use Pakistan
West Virginia
Western Samoa
Wisconsin
Wyoming
Yemen
Yugoslavia
Zaire*
Zambia
Zanzibar use Tanzania

Select Geographic Descriptors by Continent

These are a recast for three continents or areas of the geographics in the preceding list. These are being added to regularly.

AFRICA

Africa, Algeria, Angola, Botswana, Burundi, Cameroon, Central African Republic, Chad, Congo, Dahomey, Equatorial Guinea, Ethiopia, French Territory of Afars and Issas, Gabon, Gambia, Ghana, Guinea, Ivory Coast, Kenya, Lesotho, Liberia, Libyan Arab Republic, Malawi, Mali, Mauritania, Morocco, Mozambique, Niger, Nigeria, Portuguese Guinea, Rhodesia, Rwanda, Senegal, Sierra Leone, Somali Republic, South Africa, South West Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda, United Arab Republic (part), Upper Volta, Zaire, Zambia

Islands: Canary Islands, Cape Verde Islands, Malagasy Republic, Mascarene Islands, Mauritius, Reunion, Sao Tome and Principe, Seychelles

ASIA

Asia, Afghanistan, Bahrain, Bangladesh, Bhutan, Brunei, Burma, Cambodia, China, Cyprus, Hong Kong, India, Indonesia, Iran, Iraq, Israel, Japan, Jordan, Korea (North), Korea (South), Kuwait, Laos, Lebanon, Malaysia, Mongolia, Nepal, Oman, Pakistan, Philippine Islands, Qatar, Ryukyu Islands, Saudi Arabia, Sikkim, Singapore, Sri Lanka, Syria, Taiwan, Thailand, Turkey (part), United Arab Republic (part), USSR (part), Vietnam (North), Vietnam (South), Yemen

OCEANIA

Oceania, Melanesia, New Caledonia, New Hebrides, British Solomon Islands, Fiji, Micronesia, Australia, Caroline Islands, Guam, Mariana Islands, New Zealand, Polynesia, American Samoa, Papua and New Guinea, Tahiti, Western Samoa

F. Language Descriptors

LANGUAGE ABBREVIATIONS
MARC Standard
(Example: LA=AFR)

(Afr)	Afrikaans	(Ind)	Indonesian
(Alb)	Albanian	(Ita)	Italian
(Arm)	Armenian	(Jpn)	Japanese*
(Aze)	Azerbaijani	(Kor)	Korean
(Bel)	Belorussian	(Lat)	Latin
(Bul)	Bulgarian	(Lav)	Latvian
(Bur)	Burmese	(Lit)	Lithuanian
(Chi)	Chinese	(Mac)	Macedonian
(Cro)	Croatian	(Nor)	Norwegian
(Cze)	Czech	(Pol)	Polish
(Dan)	Danish	(Por)	Portuguese
(Dut)	Dutch	(Rum)	Rumanian
(Est)	Estonian	(Rus)	Russian
(Fin)	Finnish	(Ser)	Serbian
(Fre)	French	(Slo)	Slovak
(Geo)	Georgian	(Slv)	Slovenian
(Ger)	German	(Spa)	Spanish
(Gre)	Greek	(Swe)	Swedish
(Heb)	Hebrew	(Tha)	Thai
(Hun)	Hungarian	(Tur)	Turkish
(Ice)	Icelandic	(Ukr)	Ukrainian
		(Mul)	Multilingual

*JAP changed to JPN 4/15/74

SECTION III: DIALOG SEARCHING

A. System Protocols

System Cues

After he has successfully logged in, either through direct dial, Telenet, Tymshare, or Telex, the user enters two-way communication with the DIALOG search program. Depending on the type of terminal he is operating, the user will receive one of two cues that it is his turn to enter information. For most terminals the user's cue is a question mark (?) on the left side of the terminal's page or display screen. A few display terminals will cue the user by positioning the cursor after ENTER_. Until one of these cues is given, the system cannot accept anything from the searcher.

Messages to the System

Once the input cue is given, the user can begin his search. The format for user input in the DIALOG system must follow the pattern:

Command Name or Symbol + Content of Command

For instance, the command SELECT CHOLERA instructs the DIALOG program to find all citations containing the term CHOLERA and tag them with a unique set number for future reference. Once the command has been typed, it is sent to the computer by striking the CARRIAGE RETURN, INT, or SEND key (depending on the terminal being used).

```
?SELECT CHOLERA
      3     378    CHOLERA
```

The computer then comes back with a three part response as shown above, consisting of the set number (3), the number of citations in the set (378), and a description of the term or terms in the set (CHOLERA). A complete explanation of the DIALOG commands can be found in section III-C.

When entering commands in DIALOG, one can choose to put a space between words or to type the command without spacing. Thus, both SELECT CHOLERA and SELECTCHOLERA are acceptable forms for entering a command. Generally speaking, in the DIALOG system when a user has doubts about whether to space, it is advisable <u>not</u> to space.

Most DIALOG commands have abbreviations and/or symbolic notations. These shortened forms may be used at all times. For instance, COMBINE 1 AND 2, C1AND2, and $1*2 are all equally acceptable commands.

DIALOG allows the user to enter truncated versions of search terms from the following fields: title, abstract, descriptor, and corporate source. The format for entering truncated terms is:

SELECT + truncated portion of search term + ?

Thus, SELECT ECONOMIC? will retrieve all citations beginning with the letters ECONOMIC -- economic, economical, economics, etc. The program will select up to 400 terms from a truncation command: if more than 400 terms are found beginning with the specified letters, the program will respond with the message, >400 TERMS; RESPECIFY. The user must then specify more letters in the initial command or use the EXPAND command to see a display of possible search terms. Truncation may also be used with formatted fields. For example, to search all authors whose last name is Hopkins, SAU = HOPKINS?

More than one command can be entered at one time by separating individual commands with semicolons. With practice several related functions can be commanded by the user with one entry; for example, one may enter: ?#TERMA;#TERMB;#TERMC;$1-3/OR;T4/6/1-2

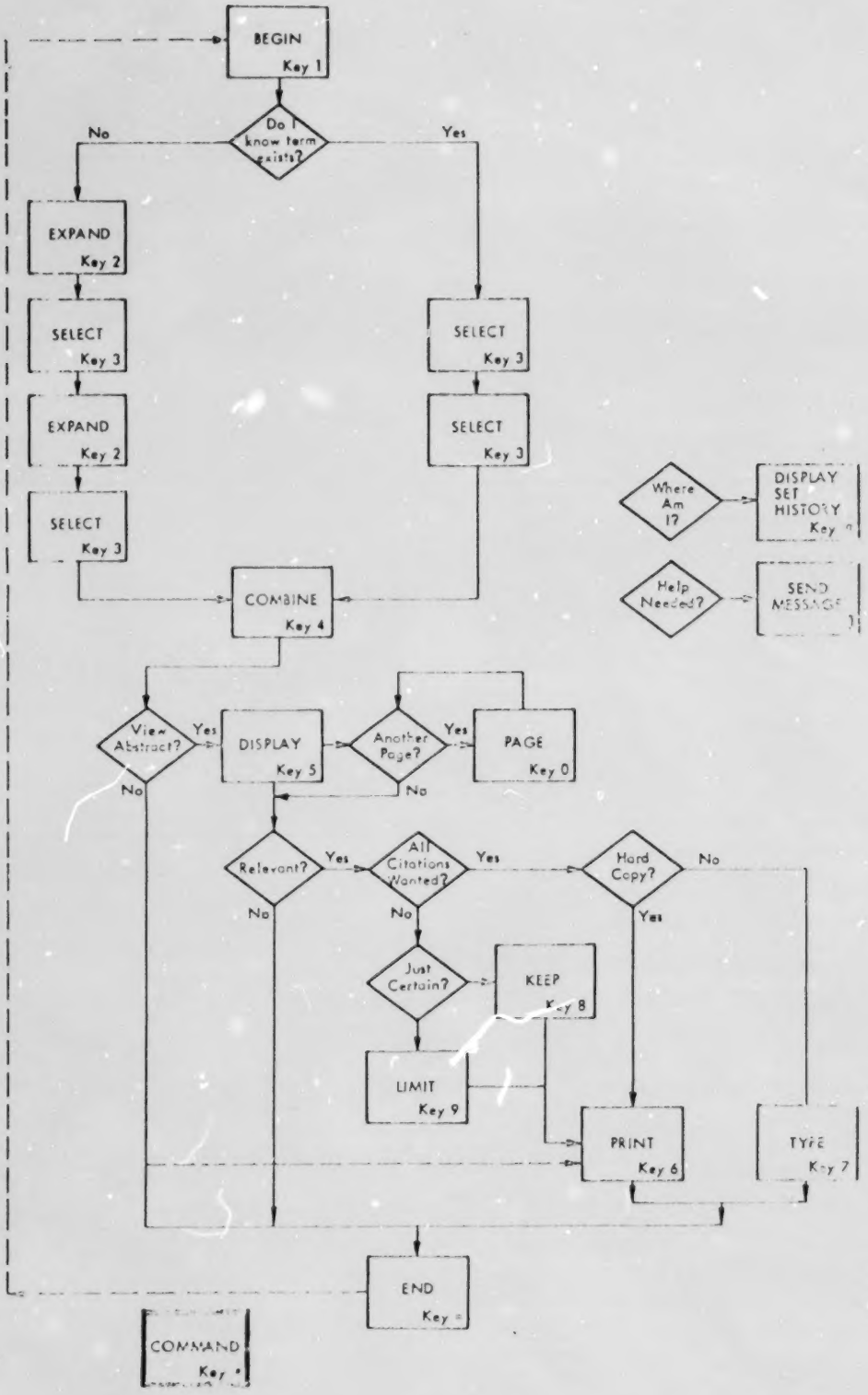
In this way the user gets down to the important task of reviewing citations in a much shorter time. Remember, however, that the entire series of commands entered at one time cannot be longer than one line, and no single command can be longer than 62 characters. Chaining of commands is recommended only after the user feels confident in using the DIALOG system.

Correcting Typographical Errors

The user may discover an error in his input message before he has sent it to the computer. He can choose to wipe out the entire line and start over or he may wish to correct the input message and then send it to the computer.

To erase an entire line and get a new user cue, simply strike the ESC (escape) key and then depress the RETURN (INT, SEND) key. The print head will go back to the left margin and print a new user cue (?).

To correct errors letter-by-letter simply strike the ← key for each letter that needs correcting, then retype the correct entry and send the message to the computer. The character correction key may differ with the


BEGIN
Key 1
Do I know term exists?
No
Yes
EXPAND
Key 2
SELECT
Key 3
EXPAND
Key 2
SELECT
Key 3
SELECT
Key 3
SELECT
Key 3
COMBINE
Key 4
Where Am I?
DISPLAY SET HISTORY
Help Needed?
SEND MESSAGE
View Abstract?
Yes
No
DISPLAY
Key 5
Another Page?
Yes
No
PAGE
Key 0
Relevant?
Yes
No
All Citations Wanted?
Yes
No
Hard Copy?
No
Yes
Just Certain?
KEEP
Key 8
LIMIT
Key 9
PRINT
Key 6
TYPE
Key 7
END
Key =
COMMAND
Key *

terminal model; for instance, some terminals require the user to hold down the CONTROL key and then strike the H key until the print head has backed up to the error. Always be sure to check operating instructions for the terminal you are using.

Messages from the System

DIALOG's portion of the online communication consists of responses to a user's commands. These responses will be either the required functional responses (set descriptions, term expansions, etc.) or error messages. There are over thirty program error messages; a full explanation of them will be found at the end of this section.

Occasionally the user will want to stop the program's responses before it is finished. To interrupt program output, simply strike BREAK key (do not hold the key down too long or the terminal may get disconnected from DIALOG). The system will stop typing and give a new user cue. BREAK can be used only to interrupt a system response; it cannot be used to erase a user's command once it has been sent to the computer.

B. Searching Sequence

As soon as the user has successfully logged in, the system will respond with a program greeting acknowledging LOGON, followed by the first user cue. During this period the user is in his default file--usually a low priced file used fairly frequently, e.g. CAIN or NTIS.

The first order of business is to enter a full BEGIN or one of the shorter BEGIN commands and select a file for searching. Once a file has been selected, the user is ready to start searching by issuing EXPAND, SELECT and COMBINE commands. Items from any of the searchable fields can be expanded in an alphabetical display and selected into sets; however, only terms in the primary inverted index (title, descriptor, corporate source and abstract fields) can be entered without field designator prefixes. If the field to be searched is not the primary inverted index, a prefix retrieval code directing the computer to the desired field must be entered before the desired search term. For example, to get alphabetic expansion of the personal author entries surrounding John Jones, the user

must enter:

EXPAND AU=JONES, J

A full list of retrieval codes can be found in section III-D.

Terms may be selected by E number from any EXPAND display, e.g. SELECT E6,E10-E13. The terms may also be selected into sets directly, e.g. SELECT PEANUT or SELECT CC=1510. As soon as all desired sets have been created, the user can then COMBINE them with the Boolean operators AND, OR, and NOT (see Section I-B). If there is a long list of sets that are to be combined with the same operator--most often OR--a good deal of time can be saved by entering the terms consecutively and then combining them in this manner: COMBINE 1-10/OR.

Complex set combinations can be made through the use of parentheses to indicate the intended logic. Thus, if the user were interested in articles on diseases of calves, he might use the following logic:

```
?#CC=3005;#CC=3010;#CC=3015;#CC=3020;$1-4/OR
     1   6113  CC=3005
     2  20689  CC=3010
     3   5210  CC=3015
     4   2645  CC=3020
     5  34628  1-4/OR
```

Categories for Veterinary Medicine

```
?#CALF;#CALVES
     6   1446  CALF
     7   3341  CALVES
?#DT=MONOGRAPH
     8  78350  DT=MONOGRAPH
?$(5AND(6OR7))NOT8
     9   1353  (5AND(6OR7))NOT8
?T9/6/1-2
1
20 M57  ID NO.- 75-9060106   981239
  PROPHYLACTIC VACCINATION OF CALVES FOR CONTROLLING LUNGWORMS
IN CATTLE
2
41.8 V6426  ID NO.- 75-9060013   981146
  SENSITIVITY OF LIVESTOCK TO NITROFURAN PREPARATIONS. CALVES,
PIGLETS, CHICKENS.
```

Once terms have been selected into sets, the citations in any set can be seen by entering the command to DISPLAY or to TYPE that set in a particular format. (If no format is specified, the system defaults to Format 2--author, title, source, descriptors). In reviewing a few sample citations; the user may discover additional search terms that he can add to the search strategy to increase the recall, or he may discover some particular aspect being recalled that he needs to try to eliminate from the output-thereby increasing the precision of his search.

To get citations from any set printed offline, the PRINT command is used. When ordering offline prints, the user may also specify that the citations are to be sorted alphabetically by author, title, or call number.

C. DIALOG Commands

The DIALOG search program employs 21 command functions. Each entry the user wishes to make must be preceded by the name of the desired function, its abbreviation, or its symbol. The function and use of the various commands are summarized below.

DIALOG COMMANDS SUMMARY

COMMANDS, ABBREVIATIONS, AND SYMBOLS	FUNCTION	SAMPLE ENTRIES
BEGIN !	Clears out previous search history and starts user back at the search heading. Prepares printout for title page; does not change mailing address.	BEGIN !
BEGIN BYPASS !B !n(file #)	Clears out previous search history and starts user back at Set 1 in his default file without going through the search heading. Should be followed by a file command with the number of the file to be searched accomplishes the same result.	BEGIN BYPASS !B !10
COMBINE C $	Joins the items in previously created Sets with the Boolean operators.	COMBINE 1 AND 2 AND 3 C 7 NOT 8 $(1OR2)AND(8OR9OR10)
DISPLAY D %	Causes items in a specified set to be displayed on the screen of a CRT terminal.	DISPLAY D3/2/1-10 %4/5

DIALOG COMMANDS SUMMARY

COMMANDS ABBREVIATIONS, AND SYMBOLS	FUNCTION	SAMPLE ENTRIES
DISPLAY SETS DS @	Reiterates the set history of all sets created since the last Begin command, or a specified range.	DISPLAY SETS DS 28-35 @
END =	Terminates a search and reports the time spent on the search.	END =
END/SAVE =/SAVE	Allows user to store away the search terms and logic from a search for use at a later time.	END/SAVE =/SAVE
END/SDI =/SDI	Allows user to store a search to be run each time the data base is updated.	END/SDI =/SDI
.EXECUTE	Performs search steps stipulated in a stored search that has been recalled. Returns the final set only.	.EXECUTE .EXECUTE 15
EXPAND E "	Displays a list of index terms alphabetically adjacent to a specified term.	EXPAND CONSUMER E NO=HD9205 "AU=JONES, H J
EXPLAIN ?	Provides online explanation of system commands, procedures, news and updates. It is used only in symbolic form.	? DISPLAY SETS ? NEWS ? UPDATE
.FILE	Allows user to switch to any data base he is authorized to search. Does not clear prior search history.	.FILE 10 .FILE 6
KEEP K (	Stores specific items from any set in a composite set (Set 99) for later use.	KEEP 5/1-3 K 7/8-15 (15/6
LIMIT L)	Allows user to restrict the items in a set to English or foreign language only. Items may be limited to a range of Lockheed ID numbers.	LIMIT 15/MAJ) 13/MIN L 25/80000-85000

DIALOG COMMANDS (con't.)

COMMANDS, ABBREVIATIONS, AND SYMBOLS	FUNCTION	SAMPLE ENTRIES
LOGOFF	Terminates search, records time spent on that search, stops connect-time accounting, and disconnects user from the DIALOG system.	LOGOFF
MESSAGE M]	Allows user to transmit a message to any other terminal that is operating at that time.	MESSAGE 1/HELP! M1/HOURS OF OPERATION]1/ARE U UP THIS SAT.
PAGE P Ø	Allows user to see additional segments of system output that is longer than 25 lines.	PAGE P P- Ø
PRINT PR &	Stores request for offline printing tasks.	PRINT 5 PR6/2/1-74 &38/5/1-23/AU,A/TI
PRINT- PR- &-	Deletes the last offline print command.	PRINT- PR- &-
.RECALL	Calls up a stored search completed in an earlier session and makes its logic available for searching.	.RECALL 4SQ
.RELEASE	Allows the user to erase saved search specifications after they are no longer useful.	.RELEASE 4SQ
SELECT S #	Chooses and groups search terms into sequentially numbered sets (up to 98).	SELECT PIGS S CC=3015 # SPLAY(W)LEG
TYPE T '	Allows user to get online display from any set on a hard copy terminal.	TYPE 5/2/1-5 T 13/6 '84/5/15-18

Begin !

This command clears the system of the previous search history and starts the user out at the search heading questionnaire. The search heading questionnaire allows the user to identify the requestor of the search, to give an address so the results may be forwarded to the correct location by the searcher, and to select the file he wishes to search from an updated display of available files.

Full BEGIN does not change the mailing address.

Begin Bypass !B

The search questionnaire generated by a full BEGIN can be bypassed in two ways: (1) by adding BYPASS or B after the BEGIN command or (2) by adding the number of the file to be searched after the BEGIN command. BEGIN BYPASS or !B starts the user out at the beginning of the set history and assumes the user's default file as the data base to be searched. BEGINn (n=file number) or !n allows the user to start out at the beginning of the set history plus select the file to be searched; thus BEGIN10 or !10 will start the user on a new set history in the CAIN file.

Combine C $

The COMBINE command allows the user to join two or more previously created sets with one or more of the Boolean operators (see Section I-B). The result of a COMBINE statement is a new set containing the results of the specified combination. Each of the following is an acceptable COMBINE statement: COMBINE 1 OR 2; C(7OR8OR9)AND(10OR11); C1*5. As illustrated by the last example, each Boolean operator has a symbolic representation in DIALOG: AND (*), OR (+), NOT (-).

Display D %

(Used with CRT display terminal). Entering the DISPLAY command with a set number will cause the first item (the citation with the highest accession number in the set) to be displayed on the terminal's screen. To continue viewing items in the set, the user depresses the PAGE key for each subsequent citation. Unless the format is specified, the program will display citations in format 2.

Display Sets DS @

Entry of this command during a search produces a reiteration of the set history up to that point. This is particularly useful in lengthy searches where the record of previously created sets has either disappeared from the display screen or has gotten buried in several feet of terminal paper.

End =

An END command terminates a particular search and reports several search statistics: clock time, elapsed time, date, user number, number of descriptors used, number of citations printed online, and file searched. END does not reset the search history or stop the clock for accounting purposes; it does reset the elapsed time to zero.

```
?END
EVENT:  TIME,SEARCHTIME,DATE,USER#,DESCR,DOCS,FILE
END:  14:19:56,000.66,08/27/75,1299,0000,0000,10
```

An END command is automatically generated by certain other DIALOG commands, namely BEGIN, .FILE, END, and LOGOFF. Thus, if a user enters a .FILE command, he will first see the two line END response indicating that that portion of his search is completed and then he will receive the response indicating that the program has switched him to a new database.

Any BEGIN command, .FILE, END, or LOGOFF will store the search for any off-line printing and record search statistics. Only LOGOFF will stop the clock for accounting time charges, and only one of the BEGIN commands will reset the search history back at Set 1.

End/Save =/Save

This command performs all the functions of the regular END command--terminates a search and reports statistics on it-- and it stores the search terms and the logic used during that search for use at a later time. After this command is entered, the computer responds with a unique serial number to be used in recalling the search specification in the future. See Section III-E for further explanation of Search Save technique.

End/SDI =/SDI

This command performs all normal end functions and also stores the search strategy as a profile for a monthly selective dissemination of information (SDI) service. As with END/SAVE, the computer responds with a serial number that should be recorded for future reference. As Lockheed adds update tapes to the data base, each stored profile will be run; any hits will be printed and mailed to the user automatically. The SDI service will continue until the profile is erased with a .RELEASE command. This is a specially priced service.

.Execute

This command instructs the DIALOG program to perform the steps in a stored search once it has been recalled. If the user enters only the command, .EXECUTE, the program will start at line one and perform all steps in order and report the results of the LAST line of the stored search. The command may be modified by specifying the last line through which the search is to be performed. Thus, .EXECUTE 15 would mean that all steps of the stored search would be performed and the results of line 15 would be reported. See section III-E for further explanation of search save techniques.

Expand E "

The EXPAND command is used to view an alphabetic display of a portion of the CAIN searchable index. This display allows the user to check the spelling of search terms, to see variant forms of the same base word, and to see terms that might be relevant to his topic which may not have occurred to him originally. Misspellings may also be picked up such as "ducklin" (cf. E13 on the following page). The EXPAND command plus the entry of a term produces an initial display of up to 20 terms labelled E1 through E20. The term entered in the command is usually the one labelled E6. Items up to number E51 may be viewed and selected as a result of one EXPAND command.

EXPAND DUCK produces the following display:

```
? EXPAND DUCK
REF        INDEX-TERM                          TYPE ITEMS RT
E1         DUCHON-------------------------            1
E2         DUCHONOVI----------------------            1
E3         DUCHTEN------------------------            1
E4         DUCHY--------------------------           13
E5         DUCITOL------------------------            1
E6         DUCK---------------------------          255
E7         DUCK PLAGUE VIRUS--------------            1
E8         DUCK'S-------------------------            4
E9         DUCKE--------------------------           11
E10        DUCKEI-------------------------            1
E11        DUCKEOLA-----------------------            1
E12        DUCKER-------------------------            2
E13        DUCKLIN------------------------            1
E14        DUCKLING-----------------------           16
E15        DUCKLINGS----------------------           97
E16        DUCKS--------------------------          324
E17        DUCKS, HABITS AND BEHAVIOR OF-             1
E18        DUCKWEED-----------------------           26
E19        DUCKWEEDS----------------------            1
ENTER-                                             MORE
```

Explain ?

This command used only in its symbolic form, allows the user to obtain online information about the DIALOG system or about recent file updates, and it allows him to get special tutorial assistance. The command ?NEWS should be used at least once a week to check up on any new developments in the system. The command ?UPDATE will display a summary of the latest information about DIALOG files that have recently been updated. Entry of ?FIELDSn (where n is the number of any DIALOG data base) will get for the user a summary of the searchable fields for that data base; for example, ?FIELDS 5 will produce a summary of searchable fields in the BIOSIS data base of Biological Abstracts. The explain command plus the name of any other command will prompt the system to give an explanation of that command. If you need to know what can be explained simply enter ?EXPLAIN.

.File

The entry .FILE followed by the number for an available data base accomplishes two things: it automatically generates an END and records search statistics for the previous search and it switches the user into the file he has specified. Thus, if the user were searching in File 1 (ERIC) on agricultural education and he decided to switch to the CAIN data base, he would enter .FILE 10. The program would record the statistics for the ERIC search and then switch to the CAIN file. The set history is not reset to Set 1; so if the user switched files after Set 10, the next set he created after switching files would be Set 11. In order to switch files plus reset the set history to Set 1, the user should enter a BEGIN followed by a file number, e.g. BEGIN 3.

Keep K (

KEEP allows the user to pick out of a particular set only those citations which are relevant to his needs. This is particularly useful for searchers who are previewing several citations on a display screen and want to print offline or type only a few highly relevant items. The format for entering KEEP commands is as follows: KEEP set#/item# or item# range. For example, KEEP 5/3-6 will keep items 3 through 6 of Set 5. All kept items go into Set 99, which can be used like all other sets; the user, however, must remember that he has stored items in that set because its use is never noted when the set history is displayed.

Limit L)

The LIMIT command allows the user to modify his search by restricting citations to those in English or to those in foreign languages. To limit a set to English citations enter: LIMIT set#/MAJ (for MAJOR language), e.g.)5/MAJ. This command will limit the set to English citations only; articles both in English and a foreign language will be excluded. To limit a set to foreign language citations only, enter: LIMIT set#/MIN (for MINOR language), e.g.)5/MIN.

Message M]

The MESSAGE command allows the user to communicate online with another terminal operating at the same time. Format for this command is: M1/content of message. The number 1 signifies that the Lockheed terminal in the Palo Alto Computer Facility is to receive the message. The content of any single message can be no longer than one line.

Page P Ø

Unless it is instructed to do so, the DIALOG program will not display at one time more lines than can fit on a CRT screen. The Program signals that there is more to be seen with the word MORE at the bottom of the display. If the user desires to see more of the display, he simply enters the PAGE command and the next portion will appear. To see again a portion of the display that has rolled off the screen, the user enters PAGE-, and the program will roll back the display.

Print PR &

After the user is satisfied that he has refined his search sufficiently during the online session, he may wish to have citations printed offline and mailed to him. This task is accomplished by entering the command PRINT plus the number of the set to be printed, the number of the format in which they are to be printed, and number range of the citations to be printed. Thus, the command PRINT 10/5/1-174 means that the user wants citations from Set 10 to be printed offline in the fullest format (5) and items 1 through 174 in Set 10 are the ones to be printed. Examples of each of the available formats aré given below:

Format 1 (Lockheed accession numbers)

959930 938668 918282 918279 917516

Format 2 (Author/title/source/call#/descriptors)

```
1
389.8 AM34    ID NO.- 75-9429064     959930
  VITAMIN E ADEQUACY OF VEGETABLE OILS
  BIERI, J G; EVARTS, R POUKKA
  J AM DIET ASSOC  66 (2):  134-139  Feb 1975
  DESCRIPTORS-  VITAMIN E, VEGETABLE OILS, UNSATURATED FATS,
CORN OIL, SAFFLOWER OIL, SOYBEAN OIL, HYDROGENATED FATS,
NUTRIENT REQUIREMENTS
```

Format 5 (Full record, formatted)

```
1
389.8  AM34    ID NO.- 75-9429064     959930
  VITAMIN E ADEQUACY OF VEGETABLE OILS
  BIERI, J G; EVARTS, R POUKKA
  J AM DIET ASSOC  66 (2):  134-139  Feb 1975
  DESCRIPTORS - VITAMIN  E, VEGETABLE OILS, UNSATURATED FATS,
CORN OIL,  SAFFLOWER OIL, SOYBEAN OIL, HYDROGENATED FATS, NUTRIENT
REQUIREMENTS
  CAT CODE-  1510
  SEARCH-  19750200
  DOC TYPE-  ARTICLE LOCATION-  FNC
  EXTRACT:  IN THIS STUDY, YOUNG MALE RATS WERE FED DIETS CONTAIN-
ING 20 PERCENT FAT IN THE FORM OF SOYBEAN, CORN, OR SAFFLOWER OIL
OR HYDROGENATED SHORTENING, AND THEIR VITAMIN E STATUS WAS
ASSESSED FOR TWENTY-SEVEN WEEKS.  ON THE BASIS OF GROWTH RATE,
RED CELL HEMOLYSIS, PLASMA CREATINE PHOSPHOKINASE ACTIVITY AND
TESTICULAR DEVELOPMENT, SOYBEAN AND CORN OILS AND SHORTENING
PROVIDED ADQUATE VITAMIN E.  WITH SAFFLOWER OIL, THERE WAS SLIGHT
RED CELL HEMOLYSIS.  WHEN TOCOPHEROLS IN CORN OIL WERE REDUCED BY
HALF, VITAMIN E STATUS STILL APPEARED NORMAL.
```

Format 6 (Title and call# only)

```
1
389.8  AM34    ID NO.- 75-9429064     959930
  VITAMIN E ADEQUACY OF VEGETABLE OILS
```

If the user does not specify the format for the offline prints, the computer will print them in format 2. If the item range is not specified, only 50 will be printed; additional print commands must then be entered to get the remaining citations printed.

The PRINT command also contains a SORT option that the user may choose to exercise. Normally, the program will print citations in reverse chronological order; that is, the last citation added to the CAIN file in a given

subject will be the first printed out. To get citations printed out in alphabetical order by author and title, the user must add this request to his print command, as shown in the following example;

PRINT 10/5/1-174/AU,A/TI,A

The DIALOG program interprets such a command in this fashion: Print Set 10 in format 5, 174 items, arranged by first author in ascending (i.e. A to Z) order and by title in ascending order under each author entry.

Print- PR- &-

Occasionally the user may make an error in requesting offline prints. He can cancel a previously entered print command under the following conditions:

(1) The PRINT- must be entered before any command that stores printing instructions is issued; that is, before .FILE, BEGIN, END, or LOGOFF.

(2) PRINT- does not allow the user to specify which PRINT command is to be deleted. It erases printing instructions only in reverse order from that in which they were given. Thus, if the user had entered two print commands during a search and had discovered an error in the first command, he would have to enter PRINT- twice in order to get the incorrect command deleted. Both sets of printing instructions would then have to be reentered correctly.

.Recall

This command calls up the specifications of a search previously completed and stored in the computer through the use of END/SAVE. To call up a stored search the user enters .RECALL plus the serial number for that search; e.g. .RECALL1TP.

.Release

As soon as the user has no more use for a particular stored search, he should delete it from the computer's storage. To do this he enters the .RELEASE command plus the serial number for that search. Since .RELEASE is a nonreversible command, great care must be taken in releasing stored

searches. It is advisable to release a search only after calling that serial number up and verifying that it is indeed the correct stored search.

Select S #

The SELECT command plus any search term causes the citations containing that term to be put into a numbered set. Up to 98 sets may be created in one search. When a SELECT command is entered, the computer responds with the set number, the number of citations in that set and a description of the set (usually a reiteration of the search term). For instance, SELECT CORN produces the following display:

SET	ITEMS	DESCRIPTION
1	7142	CORN

Without specific instructions to do otherwise, the computer searches for the occurrence of the entered term in all of the following primary fields: descriptor (/DE), corporate source (/CS), title word (/TI), and abstract (/AB). To limit the primary fields searched, the user must add the appropriate suffix to the search term. To search for the term California occurring in titles only, one would enter SELECT CALIFORNIA/TI. Selecting terms from other searchable categories of the CAIN record requires the addition of a prefix denoting which field is to be searched. For instance, to search for all citations indexed in the category for agricultural economics, enter SELECT CC=1005.

Terms may also be selected by entering the SELECT command with the E number of terms in an EXPAND display. From the display generated by the command EXPAND DUCK (see page 99), a command SELECT E6,E14-E16 (DUCK, DUCKLING, DUCKLINGS, DUCKS) produces a set of 672 citations:

SET	ITEMS	DESCRIPTION
2	672	E6,E14-E16 (E6: DUCK)

Until another EXPAND command is given, one can continue to SELECT terms from the EXPAND listing. For instance, one can make two more sets from

the display:

```
? SELECT E6,E16
     3      567        E6,E16
                       (E6:  DUCK)

? SELECT E14-E15
     4      113        E14-E15
                       (E6:  DUCK)
```

Finally, the SELECT command can be used to search the data base with the Full Text Searching technique. See section III-E for the explanation of this technique.

Type T '

(Used with printing terminals). Entering the TYPE command allows the user to have typed online citations from any set he has created. Format for the TYPE command is: TYPEset#/format#/item number or item number range, e.g. TYPE 3/2/1-10. As with the PRINT and DISPLAY commands the TYPE command will produce citations in format 2 unless another format is specified. If an item number or range of item numbers is not specified, the computer will type only the first item (the citation with the highest accession number in the set). The user must then enter the TYPE command for each subsequent citation.

D. DIALOG Retrieval Codes

The searchable elements of each CAIN unit record are tagged by two letter field designators or retrieval codes. These retrieval codes can be broken into two major categories: 1) Primary Inverted Index Designators (Suffix Codes) and 2) Formatted Field Designators (Prefix Codes).

Terms from the Primary Inverted Index may be entered with or without their field designators. If these terms are entered without field designators, all four of the categories in the Primary Inverted Index are searched, i.e. descriptors, title words, abstract words, and names from the corporate source field. For any term entered with one or more of the suffix codes attached, DIALOG will report only occurrences of that term in the field or fields specified. To illustrate, SELECT CALIFORNIA will create a set containing all citations in which the term CALIFORNIA appears in any of the

Primary Inverted Index fields, but SELECT CALIFORNIA/CS will retrieve only citations in which the term occurs in the corporate source field.

Terms from any of the other searchable categories must be entered with their appropriate field prefixes. Thus, to search for publications by R. E. Stewart, the user must enter SELECT AU=STEWART, R E. To select all items indexed by the category code for dairy products he must enter SELECT CC=2010.

A full discussion of the retrieval codes and their use is given on the following pages.

RETRIEVAL CODE SUMMARY

A. Primary Inverted Index Fields (Suffix Codes)

Code	Description	Sample Entries
/AB	Terms appearing in abstracts (Food & Nutrition Information Center items only)	#PROTEIN/AB
/CS	Corporate source terms	#OHIO/CS
/DE	Descriptors assigned to FNIC items, subject headings for monographs (LC headings since July, 1972), and geographic descriptors	#NUTRITION/DE
/TI	Terms appearing in titles or in elements enriching titles	#PECAN/TI

B. Formatted Field Codes (Prefix Codes)

AU=	Personal author entries	"AU=ROONEY, L W
CC=	NAL category codes, 1972-present	#CC=4015
DT=	Document type	#DT=MONOGRAPH
JA=	Journal Announcement date i.e., date of the CAIN tape	#JA=7506
JN=	Journal name, most often abbreviated	#JN=J PLANT SCI
LA=	Three-letter abbreviation for language of document	#LA=GER
LO=	Location of the item being cited	#LO=FNC
NO=	NAL call number	"NO=HD9000.5
OC=	Old NAL category codes, 1970-1971	#OC=35
RN=	ID number of entry on CAIN tape	#RN=74-9000762
SC=	Source code for items published by FAO, USDA or state agricultural experiment station or extension services	#SC=USDA
SD=	Search date, i.e. publication date of piece (year, month, day)	#SD=19730628
SM=	Search month, i.e. publication date of piece (year, month)	#SM=197306
SY=	Search year, i.e. year of publication of piece	#SY=1973
UD=	Update number of CAIN tape	#UD=7508 #UD=9999

Primary Inverted Index

The four fields making up the Primary Inverted Index represent the most frequently searched portions of the CAIN data base. If no field retrieval code is specified in an EXPAND or SELECT command, the DIALOG system will default to this index. Thus, SELECT BROWN will create a set with the term BROWN appearing in a title, an abstract, a descriptor, or in the name of a corporate source. Personal authors with the last name Brown would not be searched by such a command.

Only terms in the Primary Inverted Index can be searched by the technique called full text searching. This technique is discussed in section III-E.

Abstract /AB

The abstract field includes single-word terms from abstracts. At present only the Food and Nutrition Information Center's data base contains abstracts. The differences in specificity of usage between words used in titles and the same words appearing in abstracts may occasionally pose problems for the searcher and produce for him numerous false positives. To eliminate words in the abstract field from a search because they are giving false positives, select terms with limiters other than /AB. For example, SELECT ECONOMICS/TI,DE will create a set containing the word ECONOMICS only as it occurs in the title or the descriptor fields.

Corporate Source /CS

This field includes single words from the names of corporate authors and from corporate entities issuing publications, particularly units of USDA, FAO, and the various extension services and experiment stations around the country. Authority for the entry of corporate bodies is the library's Corporate Entry Authority File (CEAF); if not found there, the entry is transcribed as it appears on the piece being index.

Remember, stop words cannot be used for searching, but they must be counted if the user employs the full text searching technique to locate a corporate source. To illustrate, a user trying to locate publications

by the Association for International Development cannot use the word "for" as part of a select command since it is a stop word, yet he must count it in formulating a command for full text searching. He would enter the following:

#ASSOCIATION(1W)INTERNATIONAL(W)DEVELOPMENT/CS.

Descriptor /DE

This field includes the subject heading assigned to monographs, geographic descriptors assigned to articles, and the subject headings assigned to material indexed or cataloged by the Food and Nutrition Information Center. NAL used its own subject headings for monographs through June 1972; since July 1972, Library of Congress subject headings have been used in cataloging records. In 1973 CAIN indexing began using political geographic descriptors, and in 1975 started expanding the list and changing some to be compatible with the AGRIS and MARC geographics (see section II-D for a complete list).

Users particularly interested in the FNIC data base should write the Center for information regarding their subject heading list. NAL, FNIC, and the Library of Congress may each have used a different subject heading for the same thing; for instance, for vitamin A, FNIC uses VITAMIN A while NAL used VITAMINS (A) and LC has no subject heading for vitamin A.

Descriptors are in the Primary Inverted Index both in their bound, precoordinated form and as individual words. Thus, one may search for CONSUMER EDUCATION as a two-word descriptor or as the separate terms CONSUMER and EDUCATION. Entering the two-word phrase will automatically limit retrieval to the descriptor field, while entering the individual terms and coordinating them with the Boolean AND will retrieve from the entire Primary Inverted Index.

Title /TI

This field includes all single words (except 12 stop words) appearing in the titles of articles and monographs in the CAIN data base. Foreign language title words in the Roman alphabet --plus
their English translations are included in this field. Because the terms

in this field are essentially free text words, the user should spend a little extra effort to make sure that he has selected all possible variants of useful search terms that might appear in titles. British spellings, for instance, would be one potentially troublesome area in title word retrieval.

Formatted Fields

All other categories of the CAIN record that are searchable must be searched with one of the formatted field prefix codes. These fields include personal author, the subject category codes, NAL call numbers, item locations, document types, source codes, journal names, languages, publication dates, system update tape numbers, and item identification numbers.

Author AU=

Only personal authors, editors, or compilers will be found in this field. Corporate authors are part of the Primary Inverted Index field. Names for cataloging records will be established according to standard Anglo-American cataloging practice. For indexing records the last name is entered first, then a comma, space, initial, space, initial. e.g. #AU=LITTLE, E L. If there is another initial or JR or SR, that element is added after another space, e.g. AU=LITTLE, E L JR.

In searching the personal author field, one should always use the EXPAND command and select terms from the display. Never guess about the form of personal author entries since the same author's name may be entered in several different ways.

Category Codes (1972-present) CC=

The numerical subject classification enables the user to free himself a bit from problems inherent in searching the relatively uncontrolled vocabulary in the CAIN system. Coupling keywords with one or more of the category codes enables the user to limit his search to a fairly specific subject area without having to enter a vast number of additional qualifiers. For example, the category code for human nutrition (1510) coupled with a term such as CORN will allow the user to narrow his search very

quickly to this area without having to specify a long list of additional search terms. Care must be used, however, in using the codes. Because the categories still tend to be less specific than might be desired in some areas and since NAL indexing policy generally precludes multiple assignments of category codes, too great a reliance on them may cause the user to miss potentially valuable items.

The list of category codes now used by NAL was adopted in 1972 (see complete list in section II-D). See the entry for Old Category Codes below for an explanation of the codes used prior to 1972.

Document Type DT=

There are five types of documents that are specifically tagged for retrieval in the CAIN system:

1. DT=MONOGRAPH. Cataloging records for a monograph, a separately cataloged monograph in a series, or an analytic of a monograph in a series are tagged with this designator. The item itself may be anything from a two page leaflet to a multi-volume work.
2. DT=SERIES. Cataloging records for items in a numbered series and for other serials (open entries) are designated as SERIES. The record will be in the CAIN data base only if the title has been cataloged since 1970.
3. DT=BIB. This designation has been used since February, 1974, to tag any publication with three or more 6x9 sized pages of bibliography.
4. DT=REVIEW. Tagging of review articles began in February, 1975.
5. DT=TRANSL. This tag is used for a) articles indexed from journals, which are usually cover-to-cover translations, b) items from the NAL translation file, and c) articles which appear both in English and in other languages. Articles with only summaries in English are not tagged as translations.

Journal Announcement Date JA=

This field, consisting of the last two digits of the year and two digits indicating the month (e.g. 7407 for July, 1974), allows the user to search a specific issue of the CAIN tapes. This designator-- in use since

June, 1973-- is particularly useful for updating searches that have been run previously. Publication in the Bibliography of Agriculture will be the month following the journal announcement date.

Journal Name JN=

This field contains a listing of journal names (with postings) abbreviated according to the rules of the American Standard for Periodical Title Abbreviations. This Journal Title Abbreviation File is continually updated, so the user should do an expand to identify one variation under which a particular journal might be entered. A set made from the call number from one citation will include all title variations of the journal, unless it has been recataloged.

Language LA=

Three-letter tags are included for the language of each item in the CAIN data base. A complete list of the language abbreviations can be found in section II-D.

Location LO=

This designator allows the user to isolate special collections in the CAIN data base, either for searching separately or for purposes of excluding those items from another search strategy. The largest such collection in the data base at present is the Food and Nutrition Information Center collection (LO=FNC), but other collections such as NAL's reference collection (LO=REF) and their rare books collection (LO=RAR) can also be isolated through use of this field code.

NAL Call Number NO=

The call numbers from cataloging before 1966 are entered with a space between the class and book number, e.g. 389.8 SCH6 . LC numbers (used since 1966) are entered without spaces except before the year as part of the call number, e.g. RC620.A1N8 1973 . Call numbers also include the format designators TRANSL, FILM, FICHE, or AV, as prefixes. To retrieve all citations in a given format, one needs only to enter NO= plus the appropriate format designator. NO=TRANSL, for instance will retrieve the items that have been cataloged for the NAL translation file.

Since 1953, USDA publications have been cataloged with an A prefixed tc the classification number (e.g. A50.9 R31). Rare books have a prefix of an R with a space (R S176.R4 1657); folio books, FO or FOLIO; maps MAP; and Bee Culture Library holdings, BEE or BEE CULTURE.

Old NAL Category Codes (1970-1971) OC=

Prior to adopting the new scheme of category codes in 1972, NAL used 18 broad numerical subject categories. They are listed in section II-D. Format for entering one of the old category codes is OC= plus a two-digit number for the appropriate subject, e.g. OC=35 for entomology.

Identification Number RN=

This field consists of unique identification numbers for citations in the CAIN system (since 1973). The ID tag consists of two digits denoting the year the item was entered into CAIN followed by a seven digit number for that particular item, e.g. #RN=74-9007216.

Source Code SC=

The Source Code field allows the user to identify documents issued by four leading sources of agricultural research:

1. SC=USDA. Items published by the U.S. Department of Agriculture.
2. SC=FAO. Items published by the Food and Agricultural Organization of the United Nations.
3. SC=EXT. Items published by state agricultural extension services.
4. SC=EXP STN. Items published by state agricultural experiment stations.

For items entered into CAIN since May, 1973, one can enter the name of the State limited to corporate source (#IOWA/CS) and combine it with the Source Code for experiment station or Extension Service publications to isolate that institution's recent documents. Exceptions occur for State Extension Service publications where the name of the land-grant institution does not contain the name of the state, e.g. Rutgers, Clemson, Auburn, or Purdue. This system is not yet fully operational so call numbers should be used to supplement this search method until further notice.

Search Date SD=

This field consists of eight-digit designators for the publication dates of the items in the CAIN tapes. The number is constructed in

year-month-day order--19730628 for June 28, 1973. All items in this field will be subsumed by the broader entries for the search month and search year categories; that is, all the entries posted to SD=19730628 will also be retrieved by entering SM=197306 or SY=1973.

Search Month SM=

This field consists of six-digit year-month designators for publication dates of items in the CAIN data base. Entries in this category are subsumed by SY= as well.

Search Year SY=

This field allows the user to search by year of publication of the items in the data base. The search year designator has no relation to the time the piece appeared in CAIN; it is simply the date on the piece being cataloged or indexed. The date a conference or symposium was held is not searchable; the search date for these cases is the date of publication of the proceedings.

Update UD=

This field, like the Journal Announcement field (JA=), consists of the last two digits of the year plus a two digit designator for the month. Coupling a subject search with appropriate update numbers allows the user to limit his search to specific months of the CAIN data base. The most recent tape update is entered twice - once with its proper year-month designator and once with the designator 9999. Thus, a user who does not remember the latest update number can simply enter #UD=9999 and automatically get postings for the latest update.

E. Special Searching Techniques

Search Save

Selected search specifications can be saved in the computer for future use. Thus, lists of terms or entire search strategies can be stored and re-executed without having to re-enter each statement individually. If no terms unique to a certain data base are used (such as category codes) the saved search can be used with any data base offered by Lockheed. The four main steps involved in the search save technique are outlined here.

For purposes of illustration, let us assume that the user wishes to store specifications for the concept "essential amino acids."

Step 1. Storing the search specification:

Do the search to be saved after a BEGIN or a BEGIN BYPASS using only the commands SELECT or COMBINE. Do NOT select any terms from an EXPAND display; the E numbers will refer to different terms as additional search terms are added to the alphabetic index.

EXAMPLE

```
?!10

EVENT:  TIME,SEARCHTIME,DATE.USER#,DOCS,FILE
END:  8:39:48,000.58.07/15/75,1299,0000,0000,10
          SET ITEMS DESCRIPTIONS
          --- ----- ------------
.FILE10: NAL/CAIN ISS MAY 75
? #ARGININE;#HISTIDINE;#ISOLEUCINE;#LEUCINE;#LYSINE

            1  148  ARGININE
            2   54  HISTIDINE
            3   34  ISOLEUCINE
            4  120  LEUCINE
            5  610  LYSINE
? #METHIOINE;#PHENYLALANINE;#THREONINE;#TRYPTOPHAN

            6  474  METHIONINE
            7  215  PHENYLALANINE
            8   60  THREONINE
            9  269  TRYPTOPHAN
```

(continued on next page)

```
? #VALINE;#ESSENTIAL(F)AMINO;#LIMITING(F)AMINO
          10   42   VALINE
          11   71   ESSENTIAL(F)AMINO
          12   22   LIMITING(F)AMINO
? #SULFUR(F)AMINO;#SULPHUR(F)AMINO
          13   54   SULFUR(F)AMINO
          14   32   SULPHUR(F)AMINO
?$ 1-14/OR
          15 1962   1-14/OR
?END/SAVE
SEARCH SERIAL #:  S1
```

The search serial number should be recorded by the user, as there is no convenient way of determining online what serial numbers have been assigned to stored searches.

Step 2. Recalling a saved search for use:
When the user needs to call up a previously stored search for use, he enters .RECALL plus the serial number of the saved search. The computer then displays every line of that search.

To continue our example, let us say that the user is conducting a search on peanuts and decides to use the "essential amino acids" stored search. He has already created five sets relating to peanuts.

```
   SET ITEMS DESCRIPTIONS
   --- ----- ------------
?$1-5/OR
    6  1459  1-5/OR
?.RECALL S1
  NO. COMMAND
   1  !10
   2  #ARGININE
   3  #HISTIDINE
   4  #ISOLEUCINE
   5  #LEUCINE
   6  #LYSINE
   7  #METHIONINE
   8  #PHENYLALANINE
   9  #THRENONINE
  10  #TRYPTOPHAN
  11  #VALINE
  12  #ESSENTIAL(F)AMINO
  13  #LIMITING(F)AMINO
  14  #SULFUR(F)AMINO
  15  #SULPHUR(F)AMINO
  16  $ 1-14/OR
  17  END/SAVE
```

The stored search is now in the active work space of the user and is ready for execution.

Step 3. Executing the saved search:

After the saved search has been recalled, the user enters the .EXECUTE command, or if he wishes less than the entire saved search executed, he can enter .EXECUTE plus the number of the line through which he wishes the command to proceed. An .EXECUTE command always starts at the beginning of the recalled search specification, performs all commands in order, and reports the results of the last executable command (or the command specified). The result of the recalled search is returned as the next set in the search being conducted at the time. To continue our example then, the user enters the following command:

```
?.EXECUTE
    7       1962        SEARCH SERIAL #:  S1
?$ 6 AND 7
    8         16        6 AND 7
```

The user has called up and combined the 14 terms associated with the essential amino acids with the five terms for peanuts (set 6).

The same technique can be used to provide current awareness SDI service. The searcher simply calls up a saved search profile and then combines the set resulting from its execution with a set containing the citations in the latest updates to the CAIN file.

Step 4. Releasing saved searches:

If a saved search is no longer used or has been replaced by a more complete specification, the old search should be erased from the computer's storage in the following manner:

```
?.RELEASE S1
```

There is no maintenance charge for storing a saved search if it is released within one month. Those saved for a longer period are charged 10¢ a month for each line of the saved search specification. Thus, to save the "essential amino acids" search would cost $1.70 per month.

Full Text Searching

Terms are entered in the Primary Inverted Index (terms from the descriptor, corporate source, title, and abstract fields) in such a way that this part of the file can be searched with the technique called full texting. This technique allows the user to choose:

1) more than one term with a single select command,

2) multiple terms according to the field in which they appear in the citation (descriptor, corporate source, title, or abstract) irrespective of word order or proximity in the field, and

3) the position of terms with respect to one another in any of the four fields.

Only the SELECT command can be used in full text searching. There are three designators that are employed in this technique:

(C) To specify occurrence of terms anywhere within a citation in any position with respect to one another use (C)--"citation." For example, SELECT FOREST(C)SERVICE will create a set containing all citations in which both FOREST and SERVICE appear irrespective of their relative positions. This entry is equivalent to creating a set with FOREST, a set with SERVICE, and then combining them with AND. A citation such as "Forest Products Outlook,1974. Agricultural Research Service" could be retrieved by this command.

(F) To specify occurence of terms anywhere within the same field in any position with respect to each other, use (F)--"field." For instance, SELECT FOREST(F)SERVICE will create a set consisting of all citations in which both FOREST and SERVICE appear in the same field. An entry such as "Forest Rangers in Service to Stranded Vacationers" could be retrieved by this command since both terms appear in the title field.

(W) To specify the position of terms with respect to one another use (W)--"word." SELECT FOREST(W)SERVICE will find all occurrences of the term FOREST followed immediately by the term SERVICE. A number of intervening words may also be specified; this capability can be particularly useful when searching for names or phrases which contain one of the DIALOG stop words (e.g. of, or, for). For example if the user entered the command

SELECT ASSOCIATION(3W)ADVANCEMENT, a set would be created consisting of all citations which contain ASSOCIATION followed by ADVANCEMENT with up to three words intervening. Given such a command, the system automatically defaults to 2, 1, or no intervening words. Thus, publications by the American Association for the Advancement of Science would be retrieved by this command.

Selecting terms by field or by word position can be further specified by adding a field suffix.

/TI SELECT FOREST(F)SERVICE/TI will retrieve citations where the two words appear somewhere in the title field.

/DE SELECT CONSUMER(F)EDUCATION/DE will result in a set of citations containing the two words somewhere in the descriptor field (subject headings).

/CS SELECT FOREST(W)SERVICE/CS will retrieve all citations in which FOREST and SERVICE are adjacent in this order in the corporate source field.

/AB SELECT SCHOOL(F)LUNCH/AB will find all citations where the two words are present in the abstract field. (At present only abstracts from the Food and Nutrition Information Center are in the CAIN data base).

ERROR MESSAGES

Message	Interpretation and Remedy
BAD LINEAR-RECORD FORMAT	Linear Record format not as expected. System error – report to operator or ignore.
BOOLEAN STRING TOO LONG	Boolean string exceeds resources required to handle it. Break up COMBINE expression into parts.
COMMAND-EXECUTION ABORTED	Usually due to not enough free core storage. Try another command.
COMMAND-EXECUTION ERROR	Resources exhausted during execution of command. Try again.
DISK STORAGE OVERFLOW	Secondary storage resource for the user has exhausted during execution of command. Do desired prints then end. Notify operator.
ED001001. NOT IN FILE	Document is not in Linear File.
EMPTY ARGUMENT STRING	An argument is expected. Check manual or EXPLAIN.
EMPTY MESSAGE STRING	SEND MESSAGE has no message string.
EXCESSIVELY LONG ARGUMENT	Break up command or retry.
EXTERNAL FILE I/O ERROR	Error in transfer of data from a secondary storage (usually Inverted File, Inverted File Index, Linear File, or Linear File Index).
INPUT I/O ERROR	Error occurred during transfer of data from secondary storage device. Retry command.
INVALID ARGUMENT	Entered argument is not in expected format. Check manual or EXPLAIN.
INVALID ARGUMENT 1	Invalid specification.
INVALID ARGUMENT 2	Invalid specification.
INVALID COLLECTION NUMBER	Collection number entered during BEGIN SEARCH query is not authorized to user. Redo BEGIN.

Message	Interpretation and Remedy
INVALID COMMAND CODE	Command code not recognizable, PAGE command, but no display on screen. Reenter command.
INVALID COMMAND CONTINUATION	A chain of commands with no arguments has spanned a set of items. Break up command chain.
INVALID FORMAT CODE	Command's format code argument is invalid.
INVALID IMPLICIT COMMAND	Commands with no arguments are entered without first setting up conditions for their entry. Check manual for proper entry.
INVALID ITEM-RANGE SYNTAX	An item-range does not occur where one is expected.
INVALID MESSAGE-SEPARATOR	SEND MESSAGE has invalid argument format.
INVALID SET-RANGE OPERATOR	Combine set range (i.e., > 1-5/*) has an invalid set operator after the slash. Check manual and reenter, or break up range into smaller parts.
INVALID SET VALUE	Set value is zero or too large.
NO CORE AVAILABLE	Not enough free core storage for successful command execution. Try again then notify operator.
NO DISPLAY FOR ITEMING	An ITEM command was entered, but there is no display on the TV scope.
OUTPUT I/O ERROR	Error occurred during transfer of data to secondary storage device. Reexecute command or try another.
PARENTHESES MISMATCH	Number of right parentheses does not match number of left parentheses. Reenter command.
RANGE MONOTONIETY ERROR	The low value of an argument range is higher than the high value.

Message	Interpretation and Remedy
SET NUMBER– SYNTAX ERROR	A set number does not occur where one is expected.
TARGET-TERMINAL NONEXISTENT	SEND MESSAGE has invalid terminal number.
TARGET-TERMINAL SYNTAX ERROR	SEND MESSAGE terminal # format error.
TERM NOT IN DICTIONARY	Index term argument is too high.
UNKNOWN ERROR CONDITION	Should never occur. Try another command.
98 SETS ALREADY GENERATED	A total of 98 user sets is allotted for a search.

SECTION IV: ORBIT III SEARCHING

A. System Protocols

System Cues

After having successfully logged in either through direct dial or Tymshare, the user enters a dialog with the ORBIT III search program. Messages to the user and responses by the computer to his input are always preceded by the cue, PROG:. After the ORBIT program has finished responding to the user's input, it will signal its readiness to accept a new entry by giving the cue, USER:. The system will not accept anything from the searcher until this cue is given.

Messages to the System

Once the cue USER: has been given, the searcher can enter one of three types of messages: (1) search statements, (2) commands, or (3) responses.

1. Search Statements

Search statements are the primary means of instructing the program to select and/or combine search terms. In one search statement the searcher may enter either a single search term or a series of search terms connected by Boolean operators AND, OR, or AND NOT. Punctuation marks are not used in entering a search statement. Spacing of input terms is important in ORBIT III; the user should put normal spacing between all elements of his search--just as he would in typing a sentence. Each of the following example entries are properly formulated search statements:

```
SS 1 /C?
USER:
SORGHUM
```

or

```
SS 1 /C?
USER:
CORN AND TEMPERATURE AND YIELD
```

or

```
SS 1 /C?
USER:
FREEZE AND DRIED AND 203000 (PC)
```

In the third example note that the category code for horticultural products (20300) was used as a search term. Elements from any of the directly searchable categories of the unit record may be chosen as search terms.

These terms may be entered in truncated form if the user chooses. Truncation in ORBIT is accomplished in two ways: 1) single character substitution is done with the number symbol (#), and 2) multiple character substitution is done with the colon (:). The examples below will illustrate the techniques.

```
SS 1 /C?
USER:
ALL DUCK# (IT)
PROG:
SS 1 PSTG (     )
```

Here the index term DUCK followed by either a space or one other letter would be retreived.

```
SS 2 /C?
USER:
ALL DUCK: (IT)
PROG:
SS 2 PSTG (     )
```

Here the index term DUCK followed by one or more letters or spaces will be retrieved. This search would retrieve not only DUCK but also DUCKS, DUCKLINGS, DUCKWEED, etc.

Note that in the examples the search term was preceded by ALL. If the user does not specify that he wishes to retrieve all occurrences of the base term, he will receive a multimeaning message from ORBIT similar to the one below:

```
SS 3 /C?
USER:
RAIN:
PROG:
MM--MULTIMEANING (RAIN:) (66)
ALL OR NONE?
```

In this case the program found 66 different search terms beginning with RAIN and it asks the user whether he wishes to retrieve all of them or none of them.

2. Commands

During his online session the user may want the system to perform some task not directly related to selecting and combining search terms; commands allow him to issue these instructions. A command may be entered

at any time after the user gets the readiness cue USER:. It should be enclosed in a set of double quotation marks as illustrated below:

```
SS 3 /C?
USER:
"NEIGHBOR BROWN, K (AU)"
```

This particular command will allow the user to view a group of terms in the personal author index alphabetically adjacent to the name "Brown, K." Commands may be entered either in their spelled out form or in an abbreviated format; a complete list of ORBIT commands and their abbreviations is given in section IV-C.

3. Responses

Frequently, the ORBIT Program will need to ask the user a question before it can complete its instructions. Whenever this situation occurs, the program will specify a series of answers from which to choose. The user needs only to enter the appropriate response--without punctuation--and the system will proceed. For instance, in the logging off procedure the system responds to the command, "STOP" with a question: DONE? (Y/N). At this point the system must verify that the user is really finished and is ready to go offline. After he gets a USER: cue, the user simply types a Y, for yes, or an N, for no, and strikes a carriage return. Depending on the response, the system will either complete the logging off procedure or return the user to his place in the search sequence.

Correcting Typographic Errors

The user may discover an error in his input message before he has sent it to the computer. He can choose to wipe out the entire line and start over with a new USER: cue, or he may wish to make a letter-by-letter correction and then send the corrected message to the computer for processing.

To erase an entire line and get a new USER: cue, simply type a $ at the end of the incorrect line and strike the RETURN (INT,SEND) key. The printhead will go back to the left margin and print a new USER: cue.

Users of 15 cps terminals use the combination of ¢/ for each incorrect letter when searching via Tymshare, or simply the backspace key when dialing in direct.

To correct an error letter by letter simply type a backward slash (\ ) for each letter to be deleted and then type the correct entry and send it to the computer. For example, if the user had mistakenly typed SOYBAEN,

he would correct it as follows:

```
USER:
SOYBAEN\\\EAN
```

Messages from the System

The other half of the interaction between searcher and system consists of a series of messages from the ORBIT III program. These messages may be responses to search statements or commands issued by the user or they may be prompts from the system designed to facilitate the searching process. There are 21 program messages; a list of these messages plus brief descriptions of their function can be found in section IV-C.

Occasionally the user may desire to interrupt a response from the program, e.g. during a printing sequence. He can accomplish this function by striking the break key. The program will stop its response, and the user can then enter some command or he can get a new readiness cue by striking the space bar followed by a carriage return.

B. Search Sequence

Selecting the Format

As soon as the user has successfully logged in, the system will respond with the following program greeting:

```
YOU ARE ON LINE
HELLO FROM SDC/ORBIT.
YOU ARE NOW CONNECTED TO THE ORBIT DATA BASE.

WOULD YOU LIKE THE NEW- OR EXPERIENCED-USER FORMAT?
TYPE N OR E AND STRIKE THE CARRIAGE RETURN KEY.
```

The ORBIT data base (as opposed the ORBIT III search program) is a low cost, general purpose administrative file. A searcher should use this file to take care of nonsearch related tasks--such as checking on system developments through the "NEWS" command--before switching into a more costly file to begin his literature search.

The message regarding new- or experienced-user format asks, in essence, whether the user would like to see all program messages in spelled out or

symbolic form. The difference between the two versions is readily apparent:

New-User Format (N)
PROG:
SS 1 /C?--SEARCH STATEMENT 1 OR COMMAND?

Experienced-User Format (E)
PROG:
SS 1 /C?

The user may switch from one version to another at any time through use of the "VERSION" command (see section IV-C.)

Simple Search Statements

As soon as he is ready to begin his search, the user should enter: "FILE CAIN". He will then be connected to CAIN retrieval file and will be given the cue to enter his first search statement or command. He may at that time enter either a single search term chosen from any of the directly searchable categories or a series of these terms connected by the Boolean operators. Thus, both the entry LILY and the entry LILY OR LILIES are acceptable search statements. If he does not specify a particular category for searching, the system will try to find the term in any directly searchable field. If it finds that term in more than one category, it will respond with a multimeaning message. With the exception of the multiword descriptors given to some items in the Food and Nutrition Collection, only single-word search terms are used in the computer's index file. To retrieve material on day lilies, then, one must enter DAY AND LILIES.

Since the Boolean AND does not allow the user to specify either word order or proximity, false positives may occur from time to time. The stringsearching function may be employed on a subset of the file to search for any particular sequence of words, thereby eliminating these faulty coordinations. (See section IV-E for a full explanation of Stringsearching.)

As an online searching tool, the Neighbor Command is helpful, particularly if the user is uncertain about the forms in which a term may appear in the index. "Neighbor"-ing, as opposed to using right-hand truncation, can also help the user avoid selecting unwanted terms inadvertently.

Example Search: Simple Search Statements

What is available in English on the effects of moisture on growth, development, and yield of corn?

```
PROG:
SS 1 /C?
USER:
MOISTURE OR WATER OR RAIN OR RAINFALL

PROG:
SS 1 PSTG (17436)

SS 2 /C?
USER:
GROWTH OR DEVELOPMENT OR YIELD

PROG:
SS 2 PSTG (39397)

SS 3 /C?
USER:
CORN

PROG:
SS 3 PSTG (7206)

SS 4 /C?
USER:
1 AND 2 AND 3

PROG:
SS 4 PSTG (43)

SS 5 /C?
USER:
4 AND NOT FOREIGN (FR)

PROG:
SS 5 PSTG (28)
```

NOTE: The numbers in this statement refer to the items retrieved in the previous search statement.

NOTE: In order to limit a search to one directly searchable category only, the designation for that category must be entered in parentheses.

Complex Search Statements

1. Multi-line Statements

Because ORBIT III program will accept several terms in one search statement, the need may occasionally arise for using more than one line to enter all the terms necessary for a particular statement. To do this the user should end his initial line of input with the Boolean operator AND or OR. The program will then respond with a continuation message and another user cue as shown in the following example:

```
SS 1 /C?
USER:
PINE OR PINES OR PINUS OR JUNIPER OR

PROG:
CNT 1
USER:
JUNIPERS OR JUNIPERUS
```

2. Statements with Mixed Boolean Operators.

ORBIT III will accept a search statement containing different Boolean operators, but the user must be aware of the sequence in which complex statements are processed or he may wind up with very puzzling results. The ORBIT program does not allow the user to indicate how the terms in a complex search statement are to be processed; rather it automatically assumes the terms on either side of an AND to be grouped. Thus, if the user enters SEED AND SIZE OR WEIGHT, the program assumes parentheses around the first two terms and will retrieve all items containing both the words SEED and SIZE plus all items indexed by the word WEIGHT alone--with out respect to seeds. If the user meant for that statement to retrieve items on seed size or seed weight, then there are two ways of accomplishing this task as illustrated below.

Intended Interpretation: SEED AND (SIZE OR WEIGHT)

Method 1

```
SS 1 /C?
USER:
SIZE OR WEIGHT

PROG:
SS 1 PSTG (4483)

SS 2 /C?
USER:
1 AND SEED:

PROG:
SS 2 PSTG (213)
```

Method 2

```
SS 1 /C?
USER:
SEED AND SIZE OR SEED AND WEIGHT

PROG:
SS 1 PSTG (213)
```

This second method can save a bit of time when the logic is fairly simple and there are only a few terms to be dealt with. Method 1 is probably better if there are several terms or if the logic is complex.

C. ORBIT III Commands

The ORBIT search program uses 20 explicit and 2 implicit commands applicable to CAIN searchers. The functions of selecting terms and combining them with Boolean operators are performed without explicit commands; these functions are accomplished by simply entering a properly formulated search statement following the user cue. The other functions can be accomplished only through the use of one of the explicit commands. Their function and use are summarized below.

The signal to the system that a command is being entered is a set of double quotation marks. Each command name plus any other content relating to that command must be enclosed in quotation marks.

ORBIT COMMANDS SUMMARY

COMMAND & ABBREVIATIONS	FUNCTIONS	SAMPLE ENTRIES
COMMENT	Sends messages to SDC staff.	"COMMENT"
DIAGRAM DIAG	Outlines the logic of previous search statements.	"DIAGRAM" "DIAG 4"
ERASEALL ERSLL	Clears search history back to search statement 1.	"ERASEALL" "ERSLL"
ERASEBACK ERSBK ERASBK BACKUP	Erases last search statement or entire search sequence back to a specified search statement number.	"ERASEBACK" "ERSBK TO 7" "BACKUP 3"
EXPLAIN EX ?	Provides online explanation of system commands, messages, or procedures.	"EXPLAIN DIAGRAM" "EX DEFAULT MODE" "? ENTRIES OVERFLOW"
FILE	Allows user to switch to any data bases he is authorized to search.	"FILE CAIN" "FILE CHEMCON"
FILES?	Allows user to obtain a listing of the files available for the user to search during a search period.	"FILES?"
FIND FD	Allows user to bypass replying to a question from the program and enter a search without waiting for the SS_/C? cue.	"FIND BROMELIADS" "FD BEEF OR CATTLE"

COMMAND & ABBREVIATIONS	FUNCTIONS	SAMPLE ENTRIES
HELP	Provides online tutorial assistance.	"HELP"
NEIGHBOR NBR	Displays a list of index terms alphabetically adjacent to a specified term.	"NEIGHBOR GOSSYPOL" "NBR SMITH, JOHN (AU)" "NBR RALSTON (AC)"
NEWS	Displays current information about the SDC system and its various data bases.	"NEWS"
PRINT PRT	Gets results of any search printed either online or offline.	"PRINT" "PRT TRIAL" "PRT SS 4, FULL, OFFLINE"
RENAME RNM	Allows the user to redesignate the name of any command or Boolean operator.	"RENAME AND TO X" "RNM TIME TO @"
RESTACK RSTK KEEP	Allows user to eliminate selectively unnecessary search statements.	"RESTACK 8, 12" "RST 9, 10 to 5"
RESTART RST	Clears entire search history and starts user over at the program greeting.	"RESTART" "RST"
SECURITY	Enables user to add an additional password to the logic procedure.	"SECURITY SPIRITOF76"
STOP	Ends search session and stops online time for accounting purposes.	"STOP"
STORAD	Stores mailing address to which offline prints are to be mailed.	"STORAD"
TIME	Allows user to perform several time keeping operations for his own records.	"TIME" "TIME RESET" "TIME INTERVAL"
VERSION VERS	Allows user to select the format of the program messages he receives.	"VERSION LONG ALL" "VERS SYMBOLIC ALL" "VERS SHORT SS"

Comment

The user may occasionally need to communicate with the SDC staff regarding the service (billing, ordering, searching support materials, etc.) or he may need explanation of something regarding one of his searches. Such communications can be entered online with the "COMMENT" command. SDS staff members monitor these messages daily and if necessary will respond by mail, by phone, or online (short answers only). Since Search Service staff do not monitor online search sequences, they cannot provide immediate responses to user comments.

Diagram DIAG

This command allows the user to get an outline of the logic used in any previously completed search statement. "DIAGRAM" entered alone will produce a reiteration of all completed search statements begining at the last one completed and proceeding back to the first statement. An outline of the particular search statement can be obtained by specifying the number of that statement in the command, e.g. "DIAG 6".

The following search sequence will illustrate the function of the "DIAGRAM" command:

```
SS 1 /C?
USER:
SOIL OR SOILS OR ALL 600500 OR ALL 601000 OR ALL 601500

PROG:
SS 1 PSTG (33565)

SS 2 /C?
USER:
CALCIUM OR CA

PROG:
SS 2 PSTG (2395)

SS 3 /C?
USER
1 AND 2

PROG:
SS 3 PSTG (335)

SS 4 /C?
USER:
"DIAGRAM 3"

PROG:
SEARCH FORMULATION BEGINNING AT SS 3:
 (SS 1:
   (SOIL OR SOILS OR ALL 600500 OR ALL 601500) PSTG (33565)
    AND SS 2:
    (CALCIUM OR CA) PSTG (2395)
   )   PSTG (335)
```

Eraseall ERSLL

The "ERASEALL" command allows the user to clear out his entire active search register and start another search sequence beginning at Search Statement 1. The command erases all previously completed search statements, but it does not obliterate any special instructions (e.g. RENAME instructions). See also ERASEBACK, RESTACK, and RESTART.

```
SS 20 /C?
USER:
"ERSLL"

PROG:
SS 1 /C?
USER:
```

Eraseback ERSBK ERASBK BACKUP

"ERASEBACK" or "BACKUP" allows the user to erase only part of the statements in the search register. By entering "ERASEBACK" alone the user can eliminate the last search statement, thus:

SS 11 /C?
USER:
"ERASEBACK"

PROG:
SS 10 /C?
USER:

To erase an entire sequence of search statements, the user specifies the search statement number to which he wishes to be returned, in this manner:

SS 15 /C?
USER:
"ERASEBACK TO 6"

PROG:
SS 6 /C?

In this instance search statements 1 through 5 have been retained in the active search register for future use, while search statements 6 through 14 have been erased.

Explain EXP ?

Occasionally the user may discover need for an explanation of some aspect of the online system--a program message, the function of a particular command, or some other aspect of searching procedure. This information can be obtained through the "EXPLAIN" command. If the user enters only "EXPLAIN", he will receive an explanation of the last program message. To get an explanation of some other feature, enter the name of that feature as part of the command.

SS 4 /C?
USER:
"EXPLAIN NO POSTINGS"

PROG:
NO POSTINGS MESSAGE:

NP--NO POSTINGS---THERE ARE NO POSTINGS FOR THE TERM ( )
EXACTLY AS ENTERED. SEARCH ABORTED.

THIS IDENTIFIES TERMS IN THE SEARCH STATEMENT WHICH HAVE NO POSTINGS. USE THE NEIGHBOR COMMAND TO CHECK WHETHER YOU MISSPELLED THE TERM OR WHETHER IT DOES NOT EXIST IN THE INDEX.

A complete list of explainable features can be obtained online by entering "EXPLAIN EXPLAIN".

File

The searcher uses the "FILE" command to switch from one data base to another that is available to him during a given search window. Entry of this command automatically erases the search sequence then ongoing and starts the user afresh in the new data base.

```
SS 12 /C?
USER:
"FILE ERIC"

PROG:
YOU ARE NOW CONNECTED TO THE ERIC DATABASE

SS 1 /C?
```

Files?

This command produces a display of the data bases available to the user during that particular 3 hour search window.

```
SS 1 /C?
USER:
"FILES?"

PROG:
YOU MAY ACCESS THE CHEMCON, CHEM 7071, CAIN, NTIS, ORBIT, INFORM,
GEOREF, MATRIX, LIBCON/E, POLLUTION, P/E NEWS, LIBCON/M, DEMO
NTIS, CIS INDEX. LIBCON/C,AND LIBCON/S DATABASES.
YOU ARE NOW CONNECTED TO THE CAIN DATABASE.
```

Find FD

The "FIND" command allows the user to enter a search statement without waiting for a readiness cue (e.g. SS 4 /C?). This command is used when the user wants to avoid having to answer one of the program's questions. For instance, if the user wishes to see no more of a "NEIGHBOR" display, he simply enters a "FIND" command as soon as the program gives him an input cue.

```
SS 1 /C?
USER:
"NBR ROONEY, L W (AU)"

PROG:

POSTINGS     TERM
   4         ROONEY, JAMES R
   2         ROONEY, L
  36         ROONEY, L W
   1         ROONEY, M L
   6         ROONEY, W F
UP N OR DOWN N?
USER:
"FIND ROONEY, L W (AU) OR ROONEY, L (AU)"
```

Help

Occasionally the searcher may reach a point where he doesn't know what to do next and needs some guidance. By typing "HELP" he can get online tutorial assistance.

```
SS 4 /C?
USER:
"HELP"

PROG:
TYPE NUMBER IDENTIFYING YOUR PROBLEM AND CARRIAGE RETURN.

1.  AM GETTING NP OR NONE MESSAGE; NEED NEW TERMS OR THE
     FORM OF SOME TERMS.
2.  WANT TO SEE SEARCH RESULTS.
3.  THE PROGRAM ASKED A QUESTION.
4.  NEED TO REVIEW OPERATING FEATURES.
5.  NEED TO REVIEW DATA BASE OR UNIT RECORD.
6.  WANT NAMES OF COMMANDS.
USER:
5

PROG:
HELP MESSAGE 5:
    TYPE "EXPLAIN UNIT RECORD"
```

Neighbor NBR

The "NEIGHBOR" command allows the user to view a portion of the online index of search terms that are alphabetically adjacent to a term he is interested in. From such a display he can ascertain the number of postings for terms and perhaps discover additional search terms to use in his retrieval strategy. Entry of the Neighbor command followed by a search

term will generate a five-term display similar to this one:

```
SS 1 /C?
USER:
"NBR ORANGE JUICE"

PROG:
POSTINGS        TERM
     2      ORANGE CO. CALIF. DEPT. OF AGRICULT (AC)
     1      ORANGE COUNTY, CALIF. PLANNING DEPT (AC)
     5      ORANGE JUICE (IT)
     1      ORANGE-BROWN (IT)
     1      ORANGE-FLAVORED (IT)
UP N OR DOWN N?
```

If the user wishes to see more terms alphabetically preceding the displayed terms, he should respond by typing UP plus the number of additional terms he wants displayed (up to 10 with any single response). To see terms further along in the alphabet, the user should respond DOWN plus the number of terms he wants displayed (up to 10 with a single response).

The user can get a larger initial display of terms by specifying in the command the number of terms to be displayed (up to 10); e. g. "NEIGHBOR 10 RICE".

Notice in the example above that the terms from all the searchable categories are interfiled. To get a display of terms from only one searchable category, the user simply specifies the category after the search term in the command statement, thus:

```
SS 1 /C?
USER:
"NBR MCWILLIAMS (AU)"

PROG:
POSTINGS     TERM
   1      MCWILLIAM, N
   1      MCWILLIAMS, R
   1      MCWILLIAMS, A L
   1      MCWILLIAMS, E
   2      MCWILLIAMS, E L
UP N OR DOWN N?
```

News

The "NEWS" command provides users online information about new developments with the ORBIT III program or with any of the data bases in the system (updates, changes, etc.). Users should enter this command the first time they log in to the ORBIT each week so that they can be apprised of any

changes that might affect their searching.

Print PRT

Once he has received a postings message for a search statement, the user can view all or any number of the retrieved citations through use of the "PRINT" command. The ORBIT III program allows the user great flexibility in choosing the categories of information to be displayed. He may, for instance, choose to see author, title, and source reference, or only titles and descriptors; and he may choose to have the citations printed online or he may have them printed offline and mailed to a patron's address. A summary of the printing options is given in the sections that follow.

Standard Print Commands

There are three standard printing options which will display predetermined categories from the unit record.

1. "PRINT FULL". Displays online all printable categories from one unit record. The category labels will be printed in their compact or abbreviated form. More than one record may be seen by specifying how many citations are to be printed at one time; for example, "PRINT FULL 5" will produce a display of five full unit records.

2. "PRINT TRIAL". This printing option is particularly useful in assessing the quality of retrieval during the search process. The "PRINT TRIAL" option displays the titles, category codes, descriptors, and ID numbers of two unit records. From this information the user can determine whether his search strategy is retrieving relevant citations, and he can perhaps identify additional search terms to use in retrieving additional items. The user can get more than the usual two citations printed by specifying the number to be displayed in the command, e.g. "PRINT TRIAL 4".

3. "PRINT". The "PRINT" command entered alone will produce a display containing all the key bibliographic elements in five unit records. These elements from the CAIN unit record include: title, author, corporate source, source reference, publication date, category codes, document type, call number, and ID number. As with the other standard print options, the user can override the default on number of records printed by specifying the number he wishes to see, e.g. "PRINT 10".

Sample standard print displays:

```
SS 3 /C?
USER:
"PRINT FULL"

PROG:
TI - THE MECHANISM OF CLOUD LOSS PHENOMENA IN ORANGE JUICE
AU - KROP, J J P
SO - WAGENINGEN, 107 P. ILLUS.
PD - 1974
NO - BIBLIOGRAPHY: P. 101-107
SE - AGRICULTURAL RESEARCH REPORTS 830
PC - 203000
DT - MONOGRAPH
LA - ENG
CN - 105.2 V61V NO. 830
ID - 759653290

SS 3 /C?
"PRT TRIAL"

PROG:
TI - THE MECHANISM OF CLOUD LOSS PHENOMENA IN ORANGE JUICE
PC - 203000
ID - 759653290

TI - ORANGE RECIPES/CUSTOMS, FACTS, FANCIES
PC - 151000
ST - COOKERY (ORANGES)
ID - 759652102

SS 3 /C?
"PRINT 1"

PROG:
TI - THE MECHANISM OF CLOUD LOSS PHENOMENA IN ORANGE JUICE
AU - KROP, J J P
SO - WAGENINGEN, 107 P. ILLUS.
PD - 1974
PC - 203000
DT - MONOGRAPH
CN - 105.2 C61V NO. 830
ID - 759653290
```

Tailoring Print Commands

The standard print commands may not always serve the user's needs. In such cases he can tailor the print display in any of a number of ways. The following "PRINT" command illustrates all the various options available to the user:

"PRT OFFLINE, SS 7, AU, TI, SO, PD, SORT AU, TI, INDENTED, SKIP 1000, STORAD"
1 2 3 4 5 6 7 8

1. Command. Every printing command must begin with a set of double quotations marks and the word PRINT or its abbreviation PRT. Never enter a comma after the name of the command.
2. Offline Printing Option. The default mode for printing is online, so unless the user specifies OFFLINE in his print command, he will receive the citations online at his terminal. Entering OFFLINE as part of the print command will cause the citations to be printed at the SDC facility, and the printout will be mailed to the address specified by the user. Default for offline printing is up to 1000 citations. If the user wishes to have more than that number printed, he must use more than one printing command and employ the skip option (see 7 below).

   If the user doesn't specify a stored address to which the printout is to be mailed, the inclusion of OFFLINE in the printing command will cause the program to ask for a mailing address before it processes the command (see 8 below).
3. Search Statement Number. The user may choose to have printed the citations from any completed search statement, i.e. for which a postings message was received. If he does not specify which search statement is to be printed, the program defaults to the last statement and prints it.
4. Categories for Printing. Any of the printable categories from the CAIN unit record may be included in or excluded from a printing command. In a tailored print command in which unit record categories are specified, the ORBIT program prints the categories in the order they are listed in the command statement. For instance, the sample print command above requires that the four categories be printed in the following order: author, title, source reference, publication date.

   The standard print command options are also available for offline printing. Thus, "PRT FULL OFFLINE" will get a printout containing all printable categories for each citation. Occasionally, the user may find it advantageous to use either the "PRINT" or "PRINT FULL" option and simply exclude unwanted categories in the following manner:

   "PRT FULL OFFLINE EXCLUDE DT, ID, SN"

   Such a command will print all categories normally printed in a "PRINT FULL" except for document type, ID number, and source name.

   When entering printable categories in print commands, user must separate category designators with commas. Use of commas to separate other parts of the printing specifications is purely optional; consistent use of commas, however, may be simpler to remember.
5. Sorting Offline Printouts. The usual order for printing citations both on and offline is reverse chronological order; that is, the most recent addition to the CAIN database is the first thing printed out. The user can, however, choose to have his printout sorted in some other fashion--for example, by author

and title or by call number. Citations may be sorted according to any printable category in ascending order--A to Z, smallest number to largest--by use of the term SORT, or they may be sorted in descending order--Z to A, largest to smallest--by using the term SORTD. The terms SORT or SORTD must then be followed by the abbreviations for the categories which are to be the basis of the sort-- SORT AU for an alphbetic sort by author, A to Z.

6. Indented or Compact Category Labels. The ORBIT III program usually prints the labels for the various unit record categories in their abbreviated form--TI, AU, SO, etc. Some users, however may wish to have these labels spelled out, particularly if the printout is to be given to a patron unfamiliar with reading the CAIN citations. To get the category labels spelled out, enter INDENTED as part of the print command.
7. Skip Option. Since ORBIT III normally prints citations in sequential order, the user must use the skip option if he wishes to view citations out of regular sequence. To illustrate, the command "PRT TRIAL S$ 5 SKIP 50" will produce a display of citations 51 and 52 from Search Statement 5.
8. Stored Address. The user may wish to store one address to which all printouts will be sent. This task is accomplished through use of the "STORAD" command. Once the address has been stored, the user simply enters the term STORAD as part of the printing command, and the computer will then use the stored address for mailing the printout. If STORAD is not entered as part of the printing command, the user must then enter address information before the command will be processed.

Rename RNM

The "RENAME" command allows the user to redesignate the name of any program command, any Boolean operator, and any of the "PRINT" command options. The renaming of ORBIT elements applies only to the user's own terminal and continues in effect only during that online session. The user can cancel any "RENAME" command by entering "RESTART" or by issuing another "RENAME" command.

```
SS 1 /C?
USER:
"RENAME TIME TO END"

PROG:
'TIME' HAS NOW BEEN RENAMED TO 'END'.
```

Restack RSTK KEEP

"RESTACK" allows the user to erase completed search statements no longer necessary for his strategy while retaining selected statements in the active search register. It differs from the "ERASEALL", and "RESTART" commands in the degree of flexibility and selectivity it offers the user in choosing which search statements are to be saved and which erased. The command may be used by itself or with additional specification. Its use is illustrated in the table below:

ONLINE ENTRIES	DESCRIPTION OF OPERATION
1. Command name alone: USER: "RESTACK" PROG: SS 2 /C?	Saves the last completed search statement, renumbers it to SS 1, erases all other statements, and gives the user a readiness cue for SS 2.
2. Command + SS number: USER: "RSTK 12, 15" PROG: SS 3 /C?	Saves the search statements that are specified in the command, renumbers them beginning at SS 1 and gives the user a readiness cue for the next search statement in the sequence.
3. Command + renumbering specification: USER: "RSTK 12, 15 TO 7" PROG: SS 9 /C?	Saves the specified search statements, renumbers them beginning at the SS number indicated after TO, and gives a readiness cue for the next search statement. All statements prior to the beginning of the renumbering sequence are saved.

Restart RST

The most thoroughgoing of the erasing commands, "RESTART" not only erases all search statements but it also cancels any special instructions (e.g. RENAME) and starts the user over at the program greeting in the ORBIT database. The "RESTART" command, like the "STOP" command, requires confirmation form the user.

Security

This command allows the user to enter an additional password of his own choice to the logging in procedure, thereby increasing the security of his SDC password. The security code can be any combination of letters, numbers or spaces up to a maximum of 10 characters. The steps involved in entering, using, changing, and deleting the security code are outlined in the sections that follow:

1. Creating the Code. The command required to set up the security code is as follows:

```
SS 1 /C?
USER:
"SECURITY AHR73"

PROG:
YOUR NEW SECURITY CODE IS AHR73.
```

2. Using the Code. After the code has been established, any user who logs in under that SDC password must also enter the security code, as illustrated below:

```
/LOGIN (User's SDC password)

YOU ARE ONLINE
HELLO FROM SDC/ORBIT
ENTER SECURITY CODE:

USER:
AHR73

PROG:
YOU ARE NOW CONNECTED TO THE ORBIT DATABASE...
```

3. Changing the Code. After a user has successfully logged in under an existing security code, he can change the code to something else by entering a new "SECURITY" command.

```
SS 1 /C?
USER:
"SECURITY SPEEDY"

PROG:
YOUR NEW SECURITY CODE IS SPEEDY.
```

4. Cancelling the Code. To eliminate the need for a security code in the logging in procedure, the user logs in under the existing security code and then enters the following:

```
SS 1 /C?
USER:
"SECURITY CANCEL"

PROG:
YOUR SECURITY CODE HAS BEEN DELETED.
```

Stop

When he has completed his work online, the user must enter the "STOP" command in order to terminate the online accounting for that session. This command requires confirmation, as shown below:

```
SS 20 /C?
USER:
"STOP"

PROG:
ALL DONE? (YES/NO)

USER:
Y

PROG:
PLEASE HANG UP YOUR TELEPHONE NOW.  GOOD-BYE!
```

Storad

The "STORAD" command allows the user to store an address in the computer's memory for future use in the mailing of off line printouts.

1. Entering an Address. To store an address initially or to change an address that has already been stored the user enters:

   ```
   USER:
   "STORAD"
   ```

   The program will then give him prompts to enter a name, a street/building address, and a city/state/zip code. After the user has confirmed the information that he has entered is correct, that address will be stored for future correlation with that user password.

2. Using STORAD. Once an address has been stored, all a user need do when ordering off line printing is to include the term STORAD as part of the "PRINT" command.

   ```
   "PRINT FULL SS 5 OFF-LINE STORAD"
   ```

   In response the program asks the user to supply a title for the bibliography to be printed, and the print command will then be processed.

Time

For many different reasons the user may wish to keep a record of his online time. By using the "TIME" command he can perform three different

timekeeping tasks. There are three versions of this command:

1. "TIME"--prints the clock time in the Eastern time zone.
2. "TIME INTERVAL" of "TIME I"--prints the time that has elapsed since login or since the last "TIME RESET". Elapsed time is always rounded to the nearest minute, hence it may vary slightly from the time reported for billing purposes.
3. "TIME RESET"--This command allows the user both to get a reading of the elapsed time on the current search and to have the elapsed time counter reset to zero. This command resets the elapsed time only; search statement numbers and the accounting time for which the user will be billed remain unaffected.

Version VERS

ORBIT III program messages can be displayed in three different forms--symbolic, short, or long. Normally, the messages are displayed in symbolic form (experienced user format) or in short form (new user format). The user may elect to change the format in which he receives any or all of these messages through use of the "VERSION" command.

All "VERSION" commands follow this pattern:

```
                 LONG
"VERSION + SHORT     + or                    "
           SYMBOLIC    1st two letters
                       of specific message
                       abbreviation that
                       is to be changed
```

For example, "VERSION LONG ALL" will get all standard program messages printed in their longest format--useful for brand new users. "VERSION LONG MM" on the other hand, will get only the multimeaning message printed in the long format; all other messages will be printed in the short or the symbolic format, depending on what the user has chosen.

MESSAGE NAME AND LONG FORM	APPLICATION
Readiness Cue Message SS N/C?---SEARCH STATEMENT N OR COMMAND?---ENTER SEARCH STATEMENT N OR ANY COMMAND.	Signals a new transaction. User may enter a new search or issue a command.
Number of Postings Message PSTG---NUMBER POSTINGS--THE NUMBER OF UNIT RECORDS MATCHING THIS SEARCH STATEMENT IS ( ).	Contains the number of unit records yielded by the user's search. Is followed immediately by the Readiness Cue Message.
No Postings Message NP---NO POSTINGS---THERE ARE NO POSTINGS FOR THE TERM ( ) EXACTLY AS ENTERED. IT AND ALL TERMS LINKED TO IT BY THE WORD 'AND' HAVE BEEN DELETED FROM THIS SEARCH.	Indicates that no unit record matches your search statement. Search terms may have been entered incorrectly or may not exist in the index.
None, No Match Message *NONE---NO MATCH---NO UNIT RECORD CONTAINS ALL THE ANDED TERMS IN YOUR SEARCH STATEMENT.	Indicates that no unit record contains the two or more terms ANDed in a given search.
Multimeaning Message MM ( )-( )---MULTIMEANING ( )-( )---THE TERM ( ) HAS ( ) MEANINGS.	Appears when a search term that has been entered has more than one meaning, i.e., occurs more than once in the index. This message frequently occurs with a truncated search (TERM#) or if a term occurs in more than one unit record category. If there are 5 or fewer meanings, the program will automatically display them after this message.
See? Message SEE?---(YES/NO/ALL) - DO YOU WANT TO SEE THESE TERMS? ANSWER 'YES', 'NO' TO CANCEL THE REQUEST, OR 'ALL' TO RETRIEVE ON ALL OF THEM.	Follows the Multimeaning Message when there are more than 5 meanings. User is given the option of seeing the terms (with YES), deleting the search (with NO), or having the terms ORed together in a search (with ALL).

MESSAGE NAME AND LONG FORM	APPLICATION
Continuation Cue Message CNT N---CONTINUE SS N---CONTINUE WITH THE NEXT ENTRY IN SEARCH STATEMENT N.	Signals the user to continue a long search statement on the next line.
Continue Printing Message CONTINUE PRINTING? (YES/NO)	Occurs in several situations, e.g., with a Print Command, when more items are available for display than are allowed to be printed at one time.
Designate Elements Message DESIGNATE---DESIGNATE ELEMENTS---TO BE (INCLUDED, EXCLUDED), USING COMMAS.	Signals the user to continue entering a Print Command that requires more than one line.
Up N or Down N Message UP N OR DOWN N?---HOW MANY TERMS UP OR DOWN?---ENTER THE NUMBER PRECEDED BY THE WORD UP OR THE WORD DOWN.	Allows user to continue the display of a Neighbor Command, either up or down the alphabet.
Confirm Restart Message DO YOU WISH TO RESTART? (YES/NO)	Requests user to confirm that he really wishes to have all transactions erased by the Restart Command.
Confirm Stop Message STOP? THE STOP COMMAND CLOSES ALL FILES AND TERMINATES PROGRAM OPERATION. DO YOU REALLY WISH TO STOP NOW? (YES/NO)	Requests user to confirm that he really wishes to log out.
Search Series Full Message SF,C---SEARCH SERIES FULL, ENTER COMMAND---PRESENT SERIES OF SEARCH STATEMENTS IS MAXIMUM. ENTER "ERASEBACK", OR "ERASEALL" TO MAKE ROOM FOR MORE SEARCHES, OR ENTER ANY OTHER COMMAND EXCEPT "FIND".	Indicates that the user has entered the maximum number (20) of search statements. User enters either the Eraseback, Restack, or Eraseall Command to clear the register and resume searching.
Entries Overflow Message ENT OVFLOW--ENTRIES OVERFLOW--THE NUMBER OF TERMS ENTERED EXCEEDS THE STORAGE LIMIT OF 125 TERMS IN THE ACTIVE SEARCH REGISTER.	Indicates user exceeded the maximum number of search terms that can be entered in a series of search statements. User should use the Eraseback, Restack, or Eraseall Command so that additional terms may be added.

MESSAGE NAME AND LONG FORM	APPLICATION
Specify Message SPECIFY NUMBERS, ALL, OR NONE---SPECIFY BY LIST OF NUMBERS, ALL, OR NONE-SPECIFY WHICH TERM OR TERMS YOU DESIRE BY ENTERING THE NUMBER TO THE LEFT OF THE TERM, A LIST OF SUCH NUMBERS, THE WORD ALL, OR THE WORD NONE.	Appears after the display of terms from a multimeaning Message. User may request that one or more terms (by specifying numbers), all terms (ALL), or no terms (NONE or Ø) be searched.
Records Searched, N Qualified Message (N) SEARCHED, (N) QUALIFIED, CONTINUE? (YES/NO)	Indicates on a cumulative basis the number of records that meet the specifications of a string-search or sensearch statement.
Temporary Storage Overflow Message TEMP OVFLOW--TEMPORARY STORAGE OVERFLOW, REARRANGE TERMS--ONE OF THE TERMS IN THE SEARCH STATEMENT HAS CAUSED AN OVERFLOW OF TEMPORARY STORAGE. ENTERING THE BROADEST TERMS LAST IN THE SEARCH STATEMENT MAY AVOID THIS.	Indicates that user has exceeded the temporary storage allotted to him for processing records. User should try entering high-posted terms last in the search statement.
Permanent Record Overflow Message PERM OVFLOW--PERMANENT RECORD OVERFLOW, RSTK--THE PERMANENT STORAGE ALLOCATED TO YOU HAS OVERFLOWED. RESTACK, ERASEBACK OR RESTART BEFORE CONTINUING.	Indicates that there are too many unit records stored in user's storage area. User should use either Restack, Eraseback, Eraseall, or Restart Command to make room for additional records.
Generated Terms Overflow Message GEN TERM OVFLOW--GENERATED TERM OVERFLOW BY ( )--THE TERM ( ) HAS GENERATED TOO MANY TERMS. THE TERM MUST BE MADE MORE SPECIFIC.	Indicates that a truncated search or a term using a Variable Character key has required the program to scan more items in the index or to retrieve more postings than are presently allowed. User should add more characters to the truncated term or use the Neighbor Command to identify more specific terms.
Sort for Printing Message *ONLY THE MOST RECENT NNNN RECORDS WILL BE SORTED FOR PRINTING.	Indicates that only a specified number of the most recent records will be used in filling a print request. To print earlier records, user should limit search by date.
User Error Message (The type of User Error is identified)	Appears after any one of several types of user errors. The program may continue to process the request, indicate an appropriate action, or delete the request.

D. Retrieval Codes

Each element of the CAIN unit record is tagged by a two-letter field designator or retrieval code. Once it has properly tagged all the elements in a record, the ORBIT program files all the terms into the master integrated index used for online retrieval. When the user enters a search term such as WATER, the program then goes to the index to look for that term. If it finds that term exists only in one category, the program will give the user a postings message--e.g. PSTG (473). If the term is not found, the user will receive a NO POSTINGS message.

In many cases, however, the program will find that the search term exists in several different categories--e.g. Document Type and Index Term. When this situation occurs the user receives a multimeaning message such as the one below.

```
SS 4 /C?
3 AND ARTICLE

PROG:
MM(ARTICLE)  (2)
             1   ARTICLE (IT)
             2   ARTICLE (DT)

SPECIFY NUMBERS, ALL, OR  NONE--
```

A thorough understanding of each of the retrieval categories in the unit record is necessary for efficient online searching. A full description of each category is presented in the following section.

RETRIEVAL CODE SUMMARY

A. DIRECTLY SEARCHABLE CATEGORIES

CODE	DESCRIPTION	SAMPLE ENTRIES
(AC)	Corporate author or corporate source names (--first 36 characters)	"NBR IOWA (AC)" IOWA AGRICULTURAL EXPERIMENT STATION (AC)
(AU)	Personal author names	"NBR JONES, J J (AU)" WEEVIL AND RAY, A C (AU)
(CN)	NAL call number for the item or the source refere ce	ALL HD9500: (CN)
(DT)	Document type	POULTRY AND MONOGRAPH (DT)
(FR)	Foreign language designator assigned to all non-English language publications in addition to specific language designators.	HIGH AND LYSINE AND NOT FOREIGN (FR) ALL POLDER# AND FOREIGN (FR)
(ID)	NAL identification number for each CAIN record	759063428 (ID)
(IT)	Index Term (words appearing in document titles and indexer-assigned subject terms)	ORCHIDACEAE (IT) (IT) ALL RAIN: OR ALL MOIST:
(LA)	Language, of the item	3 AND NOT RUS (LA)
(PC)	Primary Category Code (first NAL numerical subject classification code assigned to a document)	ALL SALTS AND 401500 (PC)
(PD)	Publication date of source item	RICE(IT) AND 1975 DEC OATS AND FROM 73 THRU 74
(SC)	Secondary Category Code (the second subject classification number assigned to a document)	401500 (PC) OR 401500 (SC)
(SF)	NAL special collections or special locations designator	ALL PEANUT: AND FNC (SF)
(SN)	Source name--one of five designators identifying special source of agricultural publications	NUTRITION AND USDA (SN) MILK AND FAO (SN)
(UP)	Update code identifying all items on a specific CAIN monthly update tape.	15 AND 7506 (UP)

B. INDIRECTLY SEARCHABLE CATEGORIES

CODE	DESCRIPTION	SAMPLE ENTRIES
(AB)	Words in abstracts (Food and Nutrition Information Center items only)	STRS (AB) :CONSUMER: AND :PROTECT:
(AC)	Corporate author name	STRS (AC) :ROHM A#D HAAS:
(AU)	Personal author name	STRS (AU) :LYLE: OR :LISLE:
(CN)	NAL call number	STRS (CN) :100 C12:
(DT)	Document type	STR (DT) :MONG: AND :TRANS:
(ID)	Identification number	STRS (ID) :75:
(LA)	Language of item	STRS (LA) :FRE: OR :GER:
(NO)	Notes appearing in the CAIN record describing special features of the item	STRS (NO) :ENG: AND :SUM:
(PC)	Primary category code	STRS (PC) :600500: OR :601000:
(PD)	Publication date of the source reference	STRS (PD) :JAN: OR :FEB:
(SC)	Secondary category code	STRS (SC) :301000: OR :301000:(SC)
(SE)	Series statement added to cataloging records	STRS (SE) :BENCH MARK STUDIES:
(SN)	Source name	STRS (SN) :FAO: OR :FOOD AND AGRICULTURAL:
(SO)	Source reference name or abbreviation	STRS (SO) :MODERN SCHOOLS:
(ST)	Subject terms--descriptors, subject headings, or geographics added by NAL indexers and catalogers	STRS (ST) :DISADVANTAGED YOUTH:
(TI)	Title words	STRS (TI) :HIGH LYSINE:
(TR)	Designator for a complete translation owned by NAL	STRS (TR) :TRANS:

Retrieval Codes

Each of the categories of the CAIN unit record is described in this section. All directly searchable categories are asterisked (*).

Abstract (AB)

Currently the only records in the CAIN data base that contain abstracts are those produced by the Food and Nutrition Information Center. These abstracts are not directly searchable by the ORBIT III program, but they can be searched with the stringsearching or sentence-searching techniques.

*Corporate author (AC)

This field contains the names of corporate authors or the corporate body from which a publication was issued. There is no standard authority for form of entry in this field, so the user should either truncate his search terms or use the "NEIGHBOR" command to retrieve all entries of a given corporate author. For example, the user could enter:

```
SS 1 /C?
USER:
"NBR CALIFORNIA AGRICULTURAL EXPERIMENT (AC)"

PROG:
POSTINGS        TERM
       1     CALIFORNIA (STATE) DEPT. OF PUBLIC HEAL
       2     CALIFORNIA ACADEMY OF SCIENCES
     206     CALIFORNIA AGRICULTURAL EXPERIMENT S
       6     CALIFORNIA AGRICULTURAL EXPERIMENT STAT
       2     CALIFORNIA AGRICULTURAL EXTENSION SE

UP N OR DOWN N?
```

or he could enter:

```
SS 1 /C?
USER:
ALL CALIF: (AC) AND CITRUS

PROG:
SS 1  PSTG (20)
```

*Personal author (AU)

Entries in this field are of two types--cataloging entries and indexing entries. Personal authors' names from cataloging records are entered according to standard library practice; once the entries are established, all succeeding items by that author will have the same entry.

Indexing entries, however, are not standardized except for the practice of rendering all given names as unpunctuated initials following the surname. Personal author entries for indexing records are derived strictly from the piece being indexed and thus may exhibit a wide variety of forms in the data base. For instance, one may find entries for items by Ben Arthur Davis under Davis, Ben Arthur; Davis, B A; or Davis, B depending on whether the item is a cataloging record or an indexing record and depending on the fullness he used in signing any articles that might get indexed.

Because of this potential for great variation in form of entry, the user will always be wise to use the "NEIGHBOR" command before entering a personal author search.

*NAL call number (CN)

Every entry in the CAIN data base contains the call number assigned by NAL. Items initially cataloged prior to 1966 bear a call number of the NAL classification system. Items cataloged since that time bear Library of Congress classification numbers. Searching by call number can be a particularly useful technique when one wants to locate all items in a particular group of sources. For example, to find items dealing with sorghum issued by the Texas Agricultural Experiment Station one might use the following strategy:

```
SS 1 /C?
USER:
SORGHUM AND ALL 100 T31: (CN)
PROG:
SS 1 PSTG (116)
```

When entering NAL classification numbers, always insert a space between the class number and the cutter number, e.g. 100 OR3C. LC Classification numbers are entered without spaces, e.g. HD9205.A3C8. A year as part of an LC call number is, however, preceded by a space, e.g. LB1043.A8 1973.

*Document type (DT)

The CAIN record tags each item according to type of publication. There are three main categories established.

1. MONOGRAPH. This designation is given to cataloging records for monographs, separately cataloged monographs in a series, or analytics of monographs in series. The items in this category may be anything from two-page pamphlets to multi-volume works.

2. ARTICLE. This designator is applied to indexing records for journal articles, indexed book chapters, or other portions of longer works that have been selected for indexing. Because of the high postings for this category, it should be used only in conjunction with other, more limiting terms; such as the followirg,

SS 2 /C?
USER:
PINK AND BOLLWORM AND ARTICLE (DT)

3. SERIAL. This designator is given to cataloging records for items cataloged as serials. The term SERIAL AND-ed with a form of the name for a serial publication will separate the cataloging record for that item from all the indexing records for articles published in that serial. Thus, the entry IRCS (IT) AND MEDICAL (IT) AND SERIAL (DT) would retrieve NAL's cataloging record for the IRCS Journal of Medical Science.

*Foreign (FR)

Each record in the data base is tagged according to its language of publication. In addition, SDC tags each non-English record with the designator FOREIGN. By combining subject searches with AND NOT FOREIGN (FR) or AND FOREIGN (FR), the user can easily limit his output to English or to non-English citations only. For example, 4 AND NOT FOREIGN (FR) will limit the citations retrieved in Search Statement 4 to English language only. One caution, however, this logic will exclude some foreign citations which contain English summaries since only the original language of the article is considered in assigning language designators.

*Identification number (ID)

An identification number is assigned to each citation as it is added to the file. Numbering is sequential and begins anew each year. Since 1973 two-digit year designators have been prefixed to the sequential number to make it a unique number, e.g. 739068492, 749003811, etc.

*Index Term (IT)

For purposes of direct searching terms from the Title Word category and from the Subject Term category are merged into a common Index Term category. This category can be searched by single word terms and by multiword search terms since cataloging records and items from the Food

and Nutrition Information Center are indexed with a controlled vocabulary list that contains multiword headings. In searching this category, then, one should enter both forms of common subject headings to make sure that all relevant citations are retrieved. Thus, to retrieve all items on disadvantaged youth one should enter the following:

```
SS 5 /C?
USER:
DISADVANTAGED YOUTH OR DISADVANTAGED AND YOUTH
```

*Language (LA)

Each item in the CAIN file is tagged according to language or publication (see section II-F for a complete listing of language codes). This ability to select items according to language can be useful when the patron wishes citations only in English and selected languages, as illustrated below where the patron wants only citations in English, Spanish, or Portuguese.

```
SS 8 /C?
USER:
7 AND NOT FOREIGN (FR)

PROG:
SS 8 PSTG (37)

SS 9 /C?
USER:
8 OR 7 AND SPA (LA) OR 7 AND POR (LA)

PROG:
SS 9 PSTG (52)
```

NOTES (NO)

The notes section of cataloging records in CAIN can yield valuable information about special features of the items, such as bibliographies or English summaries; other descriptive information will also be found in this section. The example which follows illustrates how stringsearching the Notes category can identify foreign language monographs with English

summaries.

```
SS 1 /C?
CATTLE AND FOREIGN (FR) AND MONOGRAPH (DT)

PROG:
SS 1 PSTG (668)

SS 2 /C?
USER:
STRS (NO) :ENG: AND :SUM:

PROG:
SS 2 PSTG (213)
```

*Primary Category Code (PC)

Each item in the data base is assigned at least one numerical subject classification code number (see section II-D for a complete list). This number--or the first number if more than one code has been assigned--is designated as the Primary Category Code. The second, and any additional code numbers assigned to an item, are designated as Secondary Category Codes.

Use of these subject category codes can relieve the user of having to input a long series of search terms in order to retrieve most relevant citations in a particular field. The category codes are especially helpful when other search qualifiers to be used are rather general. For instance, coupling general terms such as COST, BENEFIT and ECONOMICS with the category code 351000 will retrieve occurrences of the general terms in citations dealing with forest management.

Prior to 1972 a smaller and much broader list of subject categories was used by NAL. These categories do not overlap, and for complete coverage they should be used in addition to the newer code numbers. See section II-D for a list of the old category code numbers.

*Publication Date (PD)

CAIN records can be searched by date of publication of the source item. This date can be entered as year and month or as a range of years or as the determinant in a GREATER THAN or LESS THAN qualifying phrase.

The examples below will illustrate use of this category.

```
SS 1 /C?
U.S. AGRICULTURAL RESEARCH SERVICE AND 1974 MAY

PROG:
SS 1 PSTG (6)

SS 2 /C?
USER:
STRIP AND ALL MIN: (IT) AND FROM 73 THRU 75

PROG:
SS 2 PSTG (45)

SS 3 /C?
USER:
ALL FLORIDA: AND RECREATION AND GREATER THAN 71

PROG:
SS 3 PSTG (4)
```

*Secondary Category Code (SC)

Each CAIN item is assigned one subject category code number and several items will receive double codes. These second subject code numbers are designated as Secondary Category Code items. Because any subject category code number can be assigned either as a Primary Code or as a Secondary Code, the user who desires to retrieve all occurrences of a particular code number must either specify both retrieval categories in his search statement or use truncation techniques. The two possible strategies would look like this:

```
SS 3 /C?
2 AND 601000 (PC) OR 2 AND 601000 (SC)

PROG:
SS 3 PSTG (158)
```

or

```
SS 3 /C?
2 AND ALL 601000:

PROG:
SS 3 PSTG (158)
```

Series Statement (SE)

CAIN cataloging records may contain series statements, added according to standard cataloging practice. This field is not directly searchable, so one of the serial searching techniques (stringsearch or sensearch) must be used.

*Special Collections (SF)

CAIN records for items located in special subject collections are tagged for searching as a group. Presently ORBIT searches only one special collection--the items input by the Food and Nutrition Information Center. All those items are tagged with FNC (SF). Thus, to limit a subject search to FNC items only, one would AND the subject terms with FNC, e.g. ALL PEANUT: AND FNC (SF).

*Source Name (SN)

The National Agricultural Library identifies for retrieval purposes documents from five sources: U.S. Department of Agriculture (USDA), Food and Agricultural Organization of the United Nations (FAO), State Agricultural Experiment stations (AG EXP), State Agricultural Extension Services (AG EXT), and complete translations of articles and reports (TRANS).

Source Reference (SO)

The complete journal citation for articles and the imprint for monographic publications are indirectly searchable in the Source Reference Category. Stringsearching this category can be difficult since most journal citations are entered only in abbreviated form. Title abbreviations follow the rules of the American Standard for Periodical Title Abbreviations, but the user should bear in mind that retrieval problems still exist because the abbreviation standards change.

When possible the user should set up an object statement for stringsearching that allows as much latitude as possible to the search program. For instance, a user wishing to limit a search to the Southern Journal of Agricultural Economics might create a stringsearch object statement similar to the following:

```
SS 8 /C?
STRS (S) :SOUTH:J:AGR:ECON:
```

Subject Term (ST)

Items in this category are directly searchable in the Index Term (IT) Category. For purposes of serial searching (stringsearch or sensearch) the Title Word and Subject Term Categories are split.

The Subject Term Category contains multi- and single-word entries for LC subject headings assigned to cataloging records. Subdivisions applied to subject headings are treated as additional subject terms. Thus the

subject heading Marine Biology--Periodicals would be split into two subject term entries: MARINE BIOLOGY and PERIODICALS.

Single- and multiword subject headings for FNC items are also to be found in this category as are the geographic designators assigned by NAL staff (see section II-E for a complete list).

Translation (TR)

NAL maintains a modest collection of translations of documents. When these items are entered into CAIN, they are tagged by TRANSLATION AVAILABLE in the (TR) category. This category can be searched by string - or sensearching techniques only.

*Update (UP)

Each CAIN update tape can be searched individually through use of the Update retrieval category (UP). This capability can be particularly useful when the user wishes to update a search he has completed in the past. By replicating the search logic of the old search and then combining the results with appropriate update codes, the user can limit his printout to only items in the specified update tapes. For example, if a user wishes to update a search on orchidaceae he might use the following approach:

```
SS 1/C?
USER:
ORCHIDACEAE

PROG:
SS 1 PSTG (345)

(SS 21C?)
(USER:  )

1 AND 7506 (UP) OR 1 AND 7505 (UP) OR 1 AND 7504 (UP)

PROG:
SS 2 PSTG (28)
```

E. Serial Searching

ORBIT III provides the user with the ability to search any CAIN record character by character through its stringsearch or sentencesearch techniques. These text searching procedures allow the user 1)to identify useful information not retrievable through direct searching (recall that not all unit record categories are directly searchable), and 2)to eliminate "false positives" (items containing the desired search terms, but in the wrong sequence or in the wrong unit record categories).

The format for entering serial searching statements is as follows:

STRS or SENS + # of statement to be searched + (Category to be searched) + :Object string:

Stringsearch or Sentencesearch. Each serial search begins with either the word Stringsearch or Sensearch or their abbreviations STRS or SENS. No punctuation is needed to introduce the statement since this is a searching function rather than a command. Stringsearch (STRS) will cause the program to search for the characters in the object string anywhere within a unit record category. Sensearch (SENS) operates in the same manner as Stringsearch except that it will cause the program to search for the object string within a single sentence. A sentence is defined as any string of characters followed by a period and a space or the end of a unit record category.

Search Statement Number. The next element of a serial search statement is the number of the search statement to be searched. Only the number of the statement should be entered (e.g. STRS 3). If the statement number is not specified, the program will perform serial searching on the last completed search statement.

Searchable Category Qualifier. An abbreviation for the unit record category to be searched must be entered next, enclosed in parentheses, e.g. STRS 3 (AB). If no qualifier is specified, the program will search for the object string in the title category. See section IV-D for a complete list of unit record category qualifiers for serial searching.

Only one unit record category can be specified before the first object string. If the user wishes to have the same object string to be searched in more than one category, he must enter the string again, followed by the desired qualifier, thus:

STRS 3 (NO) :BIBLIOGRAPH: OR :BIBLIOGRAPH: (AB)

Object String. The last element of the serial search statement is the object string, the sequence of characters for which the program is to search. The string of characters is enclosed between colons, each representing from zero to the total number of characters in a unit record category. Colons may also be placed anywhere within an object string as well. The examples which follow will illustrate how serial searching statements

can be constructed.

STRS 4 (AB) :COST OF LIVING:

The phrase COST OF LIVING preceded and followed by a a space in the abstract category will be retrieved.

STRS 3 (NO) :ENG: AND :SUM:

This statement will search the notes category for the strings ENG and SUM. This logic would retrieve the following notes:

ENG. SUM.
ENGLISH SUMMARY
ENGLISH SUMMARIES
SUMMARY IN ENGLISH

SENS 10 (TI) :MANAG:OBJECTIVE: OR :MANAG:OBJECTIVE: (AB)

This statement will retrieve from the abstract or title a string of characters beginning with MANAG and followed by OBJECTIVE with from zero to many intervening letters, all within the same sentence. Some of the phrases that can be retrieved with this statement are:

MANAGEMENT BY OBJECTIVE
MANAGEMENT BY OBJECTIVES
MANAGING BY OBJECTIVES
MANAGEMENT OBJECTIVES

STRS 6 (AB) :MEAT BY#PRODUCTS:

This single variable character key (#) is used so that alternate spellings of the object term will be retrieved--BY PRODUCTS or BY-PRODUCTS.

Stringsearching or sentencesearching are relatively slow and time consuming procedures. The ORBIT program, consequently, is set up to process the serial searches in several different time segments, each segment varying in length depending on the number of users on the system. After each time segment, the program reports the number of items it has searched and the number of items meeting the search specifications. The user is then asked whether he wishes the search to continue. If the user says yes, the program will search another portion of the search statement and report the new results. If the user says no, or if the entire search statement has been processed, the program will report the number of postings in the next search statement of the current sequence. The

following series of statements will illustrate:

```
SS 10 /C?
USER:
STRS 9 (NO) :BIBLIOG:
PROG:
(97) SCHD (32) QUAL; CONT? (Y/N)
USER:
Y
PROG:
(215) SCHD (79) QUAL; CONT? (Y/N)
USER:
Y
PROG:
SS 10 PSTG (97)
```

Because serial searching is so time consuming, the user should try all possible direct searching techniques to limit his search output before attempting to conduct a serial search so that as few items as possible are searched character by character.

APPENDIX A

RECOMMENDED READINGS

General

Lancaster, F. W. and E. G. Fayen. Information Retrieval Online. Los Angeles: Melville Publishing Co., 1973.

Use Studies and System Descriptions

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Providing Retrieval Services

DeGennero, Richard. "Providing Bibliographic Services from Machine-Readable Data Bases--the Library's Role." Journal of Library Automation, 6(December, 1973) 215-222.

Elman, Stanley A. "Cost Comparison of Manual and Online Computerized Literature Searching." Special Libraries, 66(January, 1975) 12-18.

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Lawrence, Barbara, Ben H. Weil, and Margaret H. Graham. "Making Online Search Available in an Industrial Research Environment." Journal of the American Society for Information Science, 25(November-December, 1974) 364-369.

Maier, Joan M. "The Scientist Versus Machine Search Services: We Are the Missing Link." Special Libraries, 65(April, 1974) 180-188.

User Training

Burton, Hilary D. "Techniques for Educating SDI Users." Special Libraries, 66(May/June, 1975) 252-255.

Moghdam, Dineh. "User Training for Online Information Retrieval Systems." Journal of the American Society for Information Science, 26(May-June, 1975) 183-188.

APPENDIX B

ORBIT/DIALOG Basic Command Summary

Operation	ORBIT	Example	DIALOG	Example
Starting the search	Connected to ORBIT data base at login		Connected to default file at logon	
	"RESTART"		BEGIN BEGIN B BEGIN__ (file #)	BEGIN !B !10
Choosing search file	"FILE__" (file name)	"FILE CAIN"	.FILE__ (file #)	.FILE10
			BEGIN__ (file #)	!10 BEGIN10
Entering a search	Enter terms singly or with proper Boolean operators	ALFALFA PEAS AND TEMPERATURE	SELECT__ (term or reference no. from EXPAND display)	SELECT ALFALFA S CC=4055 S LIVE(W)OAK # AU=JONES, B F # E7-E10
	"FIND__" (desired search statement)	"FIND OAK" "FD CORN AND FUTURES"		
Viewing list of adjacent index terms	"NEIGHBOR__" (desired term)	"NBR ROSES" "NEIGHBOR OAK (IT)"	EXPAND__ (desired term)	EXPAND ROSES E AU=STEVENS, A R " NO=HD9501
Combining search terms	Use proper Boolean operators in search or use to join search statement numbers	APPLE OR APPLES 4 AND 5 AND 6 7 AND NOT 4	COMBINE__ (set nos. joined by Boolean operators	COMBINE 10R2 C1-8/OR $(10R2)AND3 $7NOT8
Reviewing search history	"DIAGRAM" "DIAGRAM__" (statement number)	"DIAGRAM 6"	DISPLAY SETS	@ DS DS7-10
Viewing search results online	"PRINT__" (format name or	"PRINT" "PRT TRIAL" "PRT TI,SO,AU"	TYPE_/_/_ DISPLAY _/_/_ (set#/format#/item# or item# range)	TYPE8/2/1-2 T16/6/1-10 '4/5/38
Ordering offline printing	"PRINT__ (format & add'l specs.)	"PRT FULL OFF-LINE"	PRINT_/_/_ (set#/format#/item# range)	PRINT8/5/1-73 &10/2/1-56

APPENDIX C

ORBIT/DIALOG Retrieval Code Summary

ORBIT	DIALOG
* (AB) Abstract	/AB Abstract, full text
(AC) Corporate author, first 36 characters	/CS Corporate source, full text
(AU) Personal author	AU= Personal author
(CN) Call number	NO= Call number
(DT) Document type 1. article 2. monograph 3. serial	DT= Document type 1. monograph 4. bib 2. review 5. trans 3. series
(FR) Foreign language	LIMIT /MAJ (English language) /MIN (Foreign Language)
(ID) ID number 759063428	RN= ID number 75-9063428
(IT) Index terms + bibliography + review	includes /CS, /TI, /AB, /DE
(LA) Language of publication	LA= Language of publication
* (NO) Notes	Print only, not searchable
(PC) Primary category code 6-place number	CC= Category code, 1972- (4-place #) OC= Category code, pre-1972 (2-place #)
(PD) Publication date, rangeable by year; add month abbrev. if desired (1975 FEB)	SY= 1975 (Search year) SM= 197502 (Search year + month) SD= 19750215 (Search year + month + date)
(SC) Secondary code 6-place number	CC= or OC=
* (SE) Series statement	Print only, not searchable
(SF) Special Collections, FNC only at this time	LO= Location FNC, RAR, REF, etc.
(SN) Source name 1. USDA 4. FAO 2. AG EXP 5. TRANSL 3. AG EXT	SC= Source code 1. USDA 3. EXT 2. EXP STN 4. FAO
* (SO) Source reference	Print only, not searchable
* (ST) Subject terms	/DE Descriptors , full text
* (TR) Translation available	included in DT=TRANS
(UP) Update, monthly tape e.g. 7506 (UP)	UD= Update, monthly tape e.g. UD=7506 Latest monthly update: UD=9999
Journal title abbrev. file not in ORBIT, search with STRS in (SO)	JN= Journal name or abbreviation
* (TI) Title	/TI Title, full text

* STRS or SENS only

APPENDIX D

NAL Category Codes (1972-)

General Agriculture and Rural Sociology
- 0505 General Agriculture and Rural Sociology

Agricultural Economics
- 1005 General Agricultural Economics and Land Economics
- 1010 Agricultural Administration and Management
- 1015 Agricultural Production Costs and Returns
- 1020 Agricultural Production Distribution (Farm Products)
- 1025 Statistical Data and Methodology
- 1030 Outlook, Policies, Programs and Legislation

Consumer Protection and Nutrition
- 1505 Consumer Protection
- 1510 Human Nutrition
- 1515 Home Economics
  (See also FNIC categories)

Agricultural Products
- 2005 Agricultural Products, General
- 2010 Dairy Products
- 2015 Livestock Products
- 2020 Poultry Products
- 2025 Field Crop Products
- 2030 Horticultural Products
- 2035 Feed Products

Animal Science
- 2505 General and Miscellaneous Animal Husbandry
- 2510 Livestock Biology
- 2515 Livestock Feeding
- 2520 Livestock Breeding

Veterinary Medicine
- 3005 Veterinary Medicine
- 3010 Infectious and Parasitic Diseases
- 3015 Non-Infectious Diseases
- 3020 Miscellaneous Diseases and Injuries

Forestry
- 3505 Forestry, General
- 3510 Forest Economics and Management
- 3515 Silviculture
- 3520 Forest Industries

Plant Science
- 4005 General Plant Science
- 4010 Plant Taxonomy and Geography
- 4015 Plant Ecology
- 4020 Plant Morphology, Anatomy and Cytology
- 4025 Plant Genetics and Breeding
- 4030 Plant Physiology and Biochemistry, General
- 4035 Physiology and Biochemistry of Field Crops
- 4040 Physiology and Biochemistry of Horticultural Crops
- 4045 Physiology and Biochemistry of Forest Trees

Plant Science, cont'd.

4050 Field Crops, Culture
4055 Horticultural Crops, Culture
4060 Miscellaneous Economic Plants, Culture

Plant Diseases, Insect Pests and Control

4505 Plant Fungus Diseases and Control
4510 Plant Bacterial Diseases and Control
4515 Plant Virus Diseases and Control
4520 Miscellaneous Plant Diseases, Injuries and Control
4525 Weeds and Weed Control
4530 Insect Pests and Control, General and Miscellaneous Plants
4535 Insect Pests and Control, Field Crops
4540 Insect Pests and Control, Horticultural Crops
4545 Insect Pests and Control, Forest Trees and Wood Products
4550 Insect Pests and Control, Products
4555 Insect Pests and Control, Animals and Man
4560 Pesticides, General

Entomology

5005 General Entomology
5010 Taxonomic Entomology
5015 Apiculture and Sericulture

Agricultural Engineering

5505 Agricultural Engineering and Farm Structures
5510 Farm Equipment

Soil and Water Resource Management

6005 Soil Science
6010 Soil Improvement Materials
6015 Soil Resources and Management
6020 Water Resources and Management

General Natural Resources and Environmental Pollution

6505 General Natural Resources and Environmental Pollution

Auxiliary Categories

7005 Life Sciences
7505 Physical Sciences and Mathematics
8005 Chemistry
8505 Technology
9005 Economics and Administration
9505 Social Sciences and Humanities
9705 Information Science